1

The Context of Systems Analysis and Design Methods

Overview

Chapter 1 introduces the role of *systems analyst* along with other participants and partners in the context of systems analysis and design. This chapter answers two questions that students often seem to have at the beginning of every course: (1) How will this course impact my career? And (2) How does the content of this course fit into the context of everything else I am learning? The focus in this chapter is placed on the systems analyst, not as the most important player, but instead as the facilitator whose responsibilities cross the entire systems problem- solving process. The most significant fourth edition improvement was to improve the coverage and interests of the analyst's customers and partners.

Chapter to Course Sequencing

Some adopters prefer to introduce information system concepts from Chapter 2 prior to, or instead of, Chapter 1. Nevertheless, Chapter 1 introduces important concepts that tie course content to the context of what the student is learning in other courses and the student's long term career.

How do we handle sequencing at Purdue? Our first course is "survey" oriented. Currently, we assign and quiz Chapter 1, but do not extensively lecture on the topic beyond the first class meeting (for which the majority of time is spent covering requisite topics such as course requirements and policies). Thus, the first true lecture in our first course actually covers Chapter 2.

The SoundStage Running Case Study

In the seventh edition, we have streamlined the SoundStage episodes to be quick introductions to the concepts presented in each chapter. The episodes in the seventh edition take a narrative rather than a dialog approach. These shorter introductions serve just as well to allow SoundStage diagrams to be used throughout the textbook. We believe this reworking makes them more readable and, thus, more useful for drawing students into the chapter content.
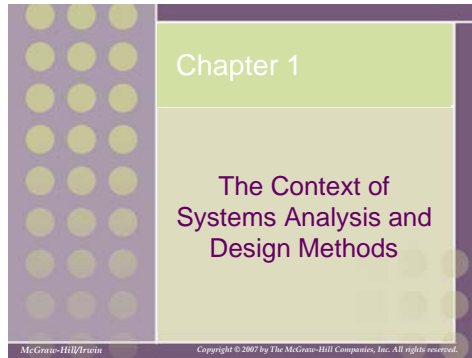
What's Different Here and Why?

1. As with the fifth and sixth editions, this chapter and all subsequent chapters includes a *visual chapter map* based on the information system building blocks model that was introduced in the last edition. The visual chapter map, based on John Zachman's *Framework for Information Systems Architecture*, demonstrates which building blocks are relevant to each chapter.

2. We added the definition for **system** to reinforce systems thinking.

3. We updated the career preparation and prospects sections.

4. We updated all technology references throughout the chapter.

5. We added a definition for **systems integration** in recognition of its growing importance in system development.

6. The section on Sequential versus Iterative Development was moved from chapter 1 to chapter 3 to consolidate the system methodology content in one place as much as possible.

Lesson Planning Notes for Slides

The following instructor notes, keyed to slide images from the PowerPoint repository, are intended to help instructors integrate the slides into their individual lesson plans for this chapter.

Slide 1

Chapter 1

The Context of
Systems Analysis and
Design Methods

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slide appearance after initial mouse click
in slide show mode

This repository of slides is intended to support the named chapter. The slide repository should be used as follows:
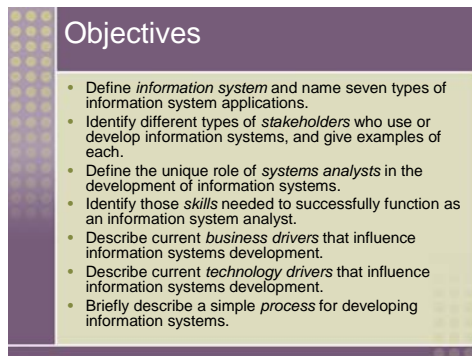Copy the file to a unique name for your course and unit.
Edit the file by deleting those slides you don't want to cover, editing other slides as appropriate to your course, and adding slides as desired.
Print the slides to produce transparency masters or print directly to film or present the slides using a computer image projector.
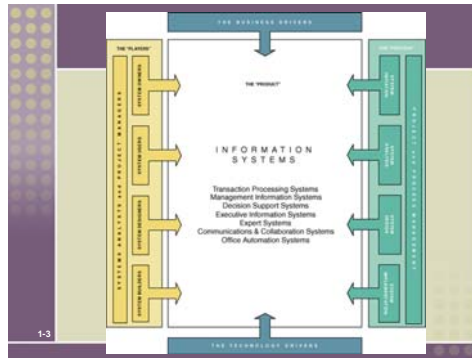
Most slides include instructor notes. In recent versions of PowerPoint, notes by default display in a window under the slide. The instructor notes are also reprinted below.

Slide 2

Objectives

- Define *information system* and name seven types of information system applications.
- Identify different types of *stakeholders* who use or develop information systems, and give examples of each.
- Define the unique role of *systems analysts* in the development of information systems.
- Identify those *skills* needed to successfully function as an information system analyst.
- Describe current *business drivers* that influence information systems development.
- Describe current *technology drivers* that influence information systems development.
- Briefly describe a simple *process* for developing information systems.

No additional notes

Slide 3

Teaching Notes
This is the first "chapter map" for the book.
Each chapter will include a chapter map that visually maps the chapter to our adaptation of John Zachman's *Framework for Information Systems Architecture*.
The complete map will be built over the course of the first three chapters.
Chapter 1 emphasizes the stakeholders column.
Conversion Notes
The map is presented in a larger format than in earlier editions.

Slide 4

A Framework for Systems Analysis and Design

A **system** is a group of interrelated components that function together to achieve a desired result.

An **information system** (IS) is an arrangement of people, data, processes, and information technology that interact to collect, process, store, and provide as output the information needed to support an organization.

Information technology is a contemporary term that describes the combination of computer technology (hardware and software) with telecommunications technology (data, image, and voice networks).

Conversion Notes
The definition of system is new to this edition, and was added to reinforce systems thinking.
This is a more concise definition of "information system" than in previous editions. It better reflects what information systems are and do rather than how they are used.
Some books use the term "computer technology." We prefer the more contemporary term "information technology" as a superset of computer technology.

Slide 5

Types of Information Systems

- A **transaction processing system** (TPS) is an information system that captures and processes data about business transactions.

- A **management information system** (MIS) is an information system that provides for management-oriented reporting based on transaction processing and operations of the organization.

- A **decision support system** (DSS) is an information system that either helps to identify decision making opportunities or provides information to help make decisions.

Teaching Notes
These definitions can be useful to help students understand what an information system is in all its varieties and flavors. Depending on the prerequisites of your course, you may want to cover these in more or less detail.

Slide 6

Types of Information Systems (cont.)

- An **expert system** is an information system that captures the expertise of workers and then simulates that expertise to the benefit of non-experts.

- A **communications and collaboration system** is an information system that enables more effective communications between workers, partners, customers, and suppliers to enhance their ability to collaborate.

- An **office automation system** is an information system that supports the wide range of business office activities that provide for improved work flow between workers.

1-6

See notes on prior slide.

Slide 7

Stakeholders: Players in the Systems Game

- A **stakeholder** is any person who has an interest in an existing or proposed information system. Stakeholders can be technical or nontechnical workers. They may also include both internal and external workers.
- **Information workers** are those workers whose jobs involve the creation, collection, processing, distribution, and use of information.
- **Knowledge workers** are a subset of information workers whose responsibilities are based on a specialized body of knowledge.

1-7

Teaching Notes
Give examples of information workers and knowledge workers to reinforce the difference. Footnote – Information workers (sometimes called "white-collar workers") have outnumbered blue-collar workers since 1957.
Typically a knowledge worker has a degree or credential in some subject area (hence, they are often called "subject area experts"). Examples include engineers, scientists, accountants, law-yers, etc.
Briefly describe a typical information system that students would be familiar with, such as an en-rollment system for the college. Invite the class to brainstorm who the stakeholders would be and which of them would be information workers or knowledge workers.

Slide 8

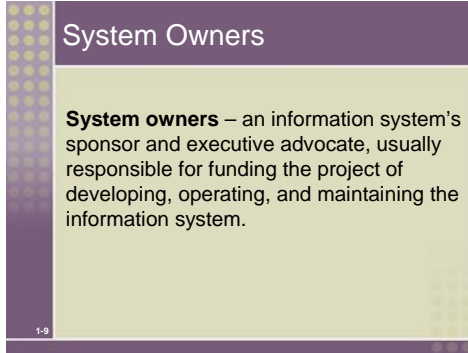**Stakeholders' Perspectives on an Information System**

1-8

Teaching Notes
This map emphasizes how each kind of stake-holder interacts with the information system. Note that the systems analyst role overlaps the roles of all the other stakeholders. The systems analyst is a facilitator to all the other roles.

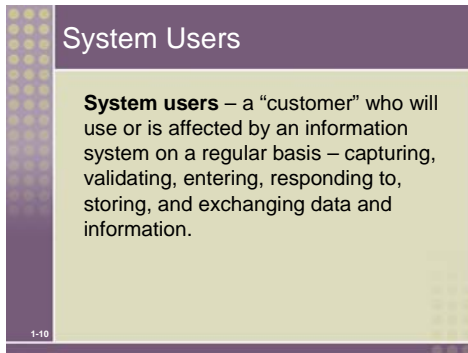Slide 9

System Owners

System owners – an information system's sponsor and executive advocate, usually responsible for funding the project of developing, operating, and maintaining the information system.

1-9

Teaching Notes
Using the information system described earlier (enrollment system or other) for the college, invite the class to identify individuals who might play the system owner role.

Slide 10

System Users

System users – a "customer" who will use or is affected by an information system on a regular basis – capturing, validating, entering, responding to, storing, and exchanging data and information.
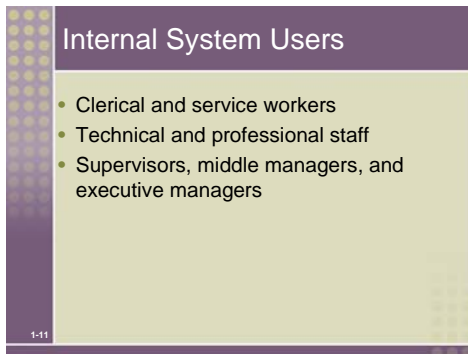
1-10

Teaching Notes
Using the information system described earlier (enrollment system or other) for the college, invite the class to identify individuals who might play the system user role.

Note that a person could be both a system owner and system user.

Slide 11

Internal System Users

- Clerical and service workers
- Technical and professional staff
- Supervisors, middle managers, and executive managers

1-11

Teaching Notes
If your course takes more of management approach, you may want to focus more on the varying roles of supervisors, middle managers, and executives.

Slide 12

External System Users

- Customers
- Suppliers
- Partners
- Employees
  - Remote users - users who are not physically located on the premises but who still requires access to information systems.
  - Mobile users - users whose location is constantly changing but who requires access to information systems from any location

1-12

Teaching Notes
Update students on the trend of "telecommuting." Telecommuting falls into our "Remote" users category.
Some students may confuse "remote users" and "external users." The difference is that remote users work for the organization in question, while external users work for some other organization (or are direct consumers).
The growth of the Web is driving the increase in both remote and external users.

Slide 13

System Designers and System Builders

System designer – a technical specialist who translates system users' business requirements and constraints into technical solution. She or he designs the computer databases, inputs, outputs, screens, networks, and software that will meet the system users' requirements.

System builders – a technical specialist who constructs information systems and components based on the design specifications generated by the system designers.

1-13

Teaching Notes
Using the information system described earlier (enrollment system or other) for the college, invite the class to identify individuals who might play the system designer or system builder role.
Programmers are typically viewed as system builders, but in fact, they are also system designers since good programmers design the software they build.
You might want to remind students that a single individual can play multiple roles in a project. For example:
- Many systems analysts are also system designers and builders.
- In reality, most technical specialists serve in most roles. For instance, database specialists typically design and construct databases.

Slide 14

Systems Analysts

Systems analyst – a specialist who studies the problems and needs of an organization to determine how people, data, processes, and information technology can best accomplish improvements for the business.

- A **programmer/analyst** (or **analyst/programmer**) includes the responsibilities of both the computer programmer and the systems analyst.
- A **business analyst** focuses on only the non-technical aspects of systems analysis and design.

1-14

Teaching Notes
Business analyst is becoming more popular because of the number of end-users and other knowledge workers being assigned to systems analysts roles in organizations.

Slide 15

The Systems Analyst as a Problem-Solver

- By "Problems" that need solving, we mean:
  - **Problems**, either real or anticipated, that require corrective action
  - **Opportunities** to improve a situation despite the absence of complaints
  - **Directives** to change a situation regardless of whether anyone has complained about the current situation

1-15

Teaching Notes
It can be useful to present examples of each scenario from the instructor's personal experiences.
The classification scheme is not mutually exclusive; that is,
a project can be driven by multiple instances and combinations of problems, opportunities, and directives.
a problem might be classified as both a true problem an opportunity, or an opportunity plus directive.

Slide 16

Where Do Systems Analysts Work?

Figure 1.2 Systems Analysts in a Typical Organization

1-16
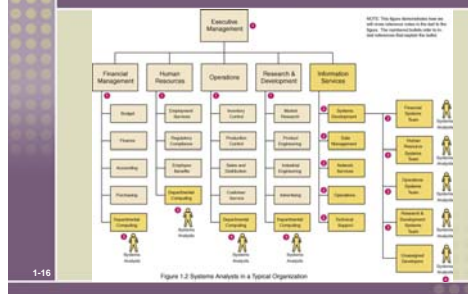
Teaching Notes
Note that every organization structures itself uniquely
Systems Analysts also work for:
Outsourcing businesses
Consulting businesses
Commercial software developers

Slide 17

Skills Needed by the Systems Analyst

- Working knowledge of information technology
- Computer programming experience and expertise
- General business knowledge
- General problem-solving skills
- Good interpersonal communication skills
- Good interpersonal relations skills
- Flexibility and adaptability
- Character and ethics

1-17

Teaching Notes
One way to underscore the need for these skills by bringing in job ads for analysts and programmers from a local newspaper. In almost all cases they will request non-technical skills as much or more as they request technical skills.

Slide 18
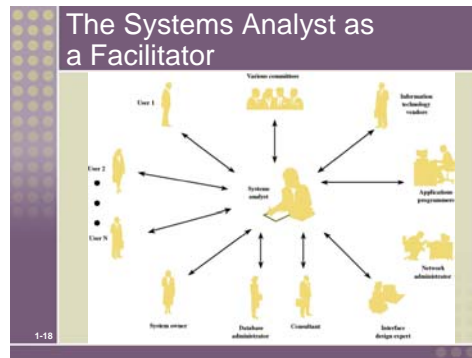
Teaching Notes
In this diagram the systems analyst is literally the person in the middle - the person who must be able to communicate with everyone else in everyone's language.

Slide 19

Teaching Notes
See the suggested readings for a book of ethics scenarios that could be introduced, tested, and analyzed as part of a lecture on computer ethics. We have always considered it important to emphasize that a person's ethical integrity is "earned." More significantly, if that ethical integrity is in any way compromised, it is difficult to repair the image.

Slide 20

No additional notes

Slide 21

Business Drivers for Today's Information Systems

- Globalization of the Economy
- Electronic Commerce and Business
- Security and Privacy
- Collaboration and Partnership
- Knowledge Asset Management
- Continuous Improvement and Total Quality Management
- Business Process Redesign

1-21

Teaching Notes
See the following slides for detailed explanations.

Slide 22

Globalization of the Economy

Global Economy brings
- New and expanded international markets
- New international competitors
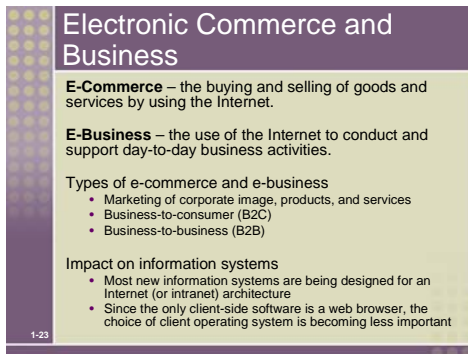
Impact on information systems
- Require support of multiple languages, currency exchange rates, business cultures
- Require consolidation of international data
- Demand for players who can communicate, orally and in writing, with management and users that speak different languages

1-22

Teaching Notes
If you use an in-class computer and project, go to www.amazon.co.uk or a similar international e-commerce site to demonstrate the globalization of commerce.

Slide 23

Electronic Commerce and Business

E-Commerce – the buying and selling of goods and services by using the Internet.

E-Business – the use of the Internet to conduct and support day-to-day business activities.

Types of e-commerce and e-business
- Marketing of corporate image, products, and services
- Business-to-consumer (B2C)
- Business-to-business (B2B)

Impact on information systems
- Most new information systems are being designed for an Internet (or intranet) architecture
- Since the only client-side software is a web browser, the choice of client operating system is becoming less important

1-23

Teaching Notes
Since the Internet is global, the Internet drives globalization and vice-versa.

Slide 24

Teaching Notes
You might ask students to name their favorite e-commerce site.

Slide 25

No additional notes.

Slide 26
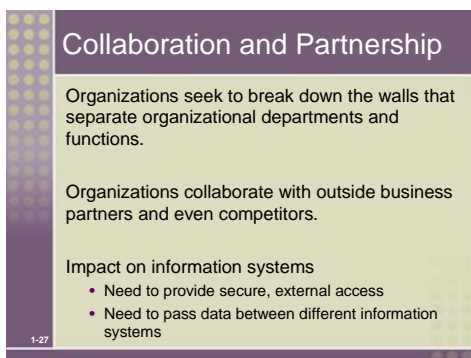
Teaching Notes
With the growth of e-commerce and e-business, security and privacy have become much more important.
With globalization information systems must comply with security and privacy laws of multiple countries. What if the security laws of one country conflicts with the privacy laws of another?

Slide 27

Collaboration and Partnership

Organizations seek to break down the walls that separate organizational departments and functions.

Organizations collaborate with outside business partners and even competitors.
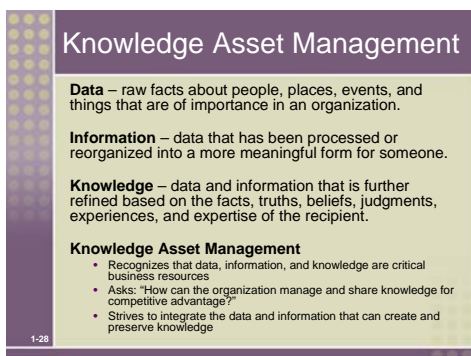
Impact on information systems
- Need to provide secure, external access
- Need to pass data between different information systems

1-27

Teaching Notes
Since the Internet is global, it has both driven and enabled collaboration and partnership.

Slide 28

Knowledge Asset Management

Data – raw facts about people, places, events, and things that are of importance in an organization.

Information – data that has been processed or reorganized into a more meaningful form for someone.

Knowledge – data and information that is further refined based on the facts, truths, beliefs, judgments, experiences, and expertise of the recipient.
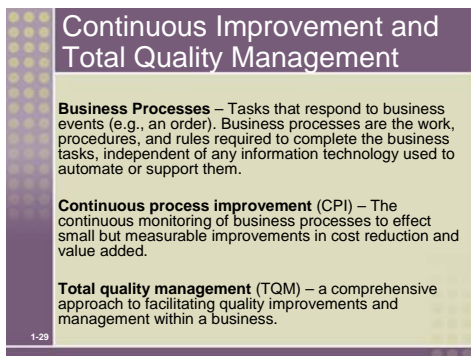
Knowledge Asset Management
- Recognizes that data, information, and knowledge are critical business resources
- Asks: "How can the organization manage and share knowledge for competitive advantage?"
- Strives to integrate the data and information that can create and preserve knowledge

1-28

No additional notes

Slide 29

Continuous Improvement and Total Quality Management

Business Processes – Tasks that respond to business events (e.g., an order). Business processes are the work, procedures, and rules required to complete the business tasks, independent of any information technology used to automate or support them.

Continuous process improvement (CPI) – The continuous monitoring of business processes to effect small but measurable improvements in cost reduction and value added.
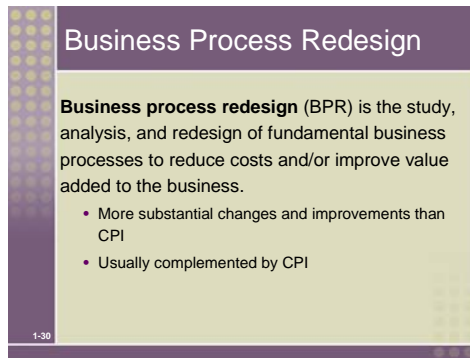
Total quality management (TQM) – a comprehensive approach to facilitating quality improvements and management within a business.

1-29

Teaching Notes
Weinberg: "If builders built buildings the same way that programmers wrote programs, the first woodpecker would destroy civilization."

Slide 30

Business Process Redesign
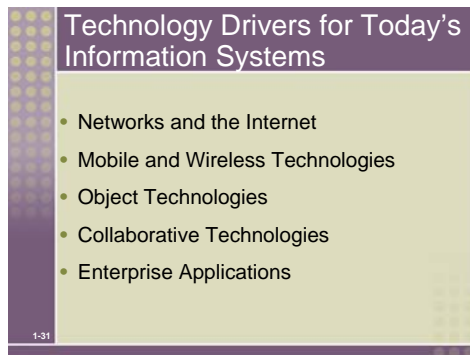
Business process redesign (BPR) is the study, analysis, and redesign of fundamental business processes to reduce costs and/or improve value added to the business.

- More substantial changes and improvements than CPI
- Usually complemented by CPI

1-30

No additional notes

Slide 31

Technology Drivers for Today's Information Systems
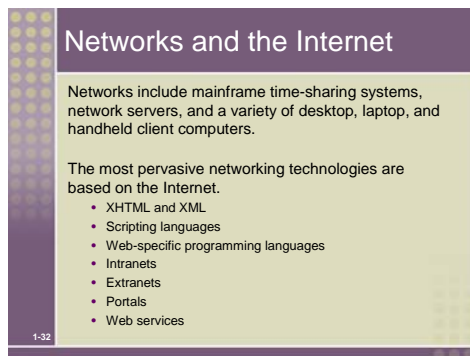
- Networks and the Internet
- Mobile and Wireless Technologies
- Object Technologies
- Collaborative Technologies
- Enterprise Applications

1-31

Teaching Notes
Students often perk up when the discussion turns to new, sexy technologies. Use that interest to get students thinking about the information system ramifications of these technologies.

Slide 32

Networks and the Internet

Networks include mainframe time-sharing systems, network servers, and a variety of desktop, laptop, and handheld client computers.

The most pervasive networking technologies are based on the Internet.
- XHTML and XML
- Scripting languages
- Web-specific programming languages
- Intranets
- Extranets
- Portals
- Web services

1-32

Teaching Notes
The text edition quotes Scott McNealy of Sun Computer saying, "The network has become the computer." Invite students to agree or disagree with that statement.
Could that statement be taken further to say that the Internet has become the computer?

Slide 33

> ### Mobile and Wireless Technologies
>
> Some mobile and wireless technologies
> - PDAs
> - Smart phones
> - Bluetooth
> - Wireless networking
>
> Impact on information systems
> - Wireless connectivity must be assumed
> - Limitations of mobile devices and screen sizes must be accommodated
>
> 1-33

Teaching Notes
Some students may be familiar with web surfing through mobile devices. Ask for their experiences.

Slide 34

> ### Object Technologies
>
> **Object technology** – a software technology that defines a system in terms of objects that consolidate data and behavior (into objects).
> - Objects are reusable
> - Objects are extensible
> - Object-oriented programming languages include C++, Java, Smalltalk, and .NET
>
> **Object-oriented analysis and design** – a collection of tools and techniques for systems development that will utilize object technologies to construct a system and its software.
>
> **Agile development** – a system development strategy in which system developers are given the flexibility to select from a variety of tools and techniques to best accomplish the tasks at hand.
>
> 1-34

Conversion Notes
This slide is new to the 7th edition
Object-oriented analysis and design tools are more integrated into the 6th edition. At the same time, the importance of structured tools and techniques is also recognized and will continue to be covered.

Slide 35

> ### Collaborative Technologies
>
> **Collaborate technologies** are those that enhance interpersonal communications and teamwork.
> - E-mail
> - Instant messaging
> - Groupware
> - Work flow
>
> 1-35

No additional notes

Slide 36

Enterprise Applications

- Virtually all organizations require a core set of enterprise applications
  - Financial mgmt, human resources, sales, etc.
  - Frequently purchased
  - Frequently need to have custom elements added

- **Systems Integration** - the process of building a unified information system out of diverse components of purchases software, custom-built software, hardware, and networking.

1-36

Conversion Notes
The 7th edition adds this definition for systems integration, recognizing its growing importance.

Slide 37

Enterprise Applications
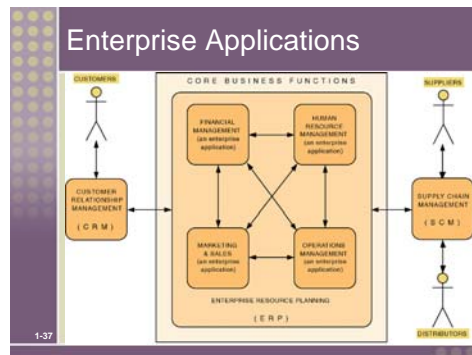
Teaching Notes
The trend is for these core enterprise applications to be purchased.
These purchased applications are never sufficient to meet all the information needs of the organization. Thus systems analysts and other developers are asked to develop value-added applications to meet additional needs.

Slide 38

Enterprise Applications - ERP

Enterprise Resource Planning (ERP) – a software application that fully integrates information systems that span most or all of the basic, core business functions.

An ERP solution is built around a common database shared by common business functions.

Representative ERP vendors:
- SSA
- Oracle/Peoplesoft
- SAP AG

1-38

Teaching Notes
ERP is dramatically changing the role of the modern systems analyst. Instead of spending effort on requirements planning and systems design, ERP redirects effort to activities such as customization, business process redesign and alignment, and system implementation.
Systems analysts who work on ERP projects are almost always called systems integrators.

Slide 39

Enterprise Applications - SCM

Supply Chain Management (SCM) – a software application that optimizes business processes for raw material procurement through finished product distribution by directly integrating the logistical information systems of organizations with those of their suppliers and distributors.

Representative SCM vendors:
- i2 Technologies
- Manugistics
- SAP
- SCT

1-39

No additional notes

Slide 40

Supply Chain

1-40
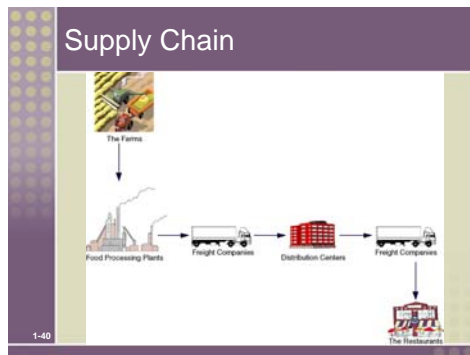
No additional notes.

Slide 41

Enterprise Applications - CRM

Customer Relationship Management (CRM) – a software application that provides customers with access to a business's processes from initial inquiry through postsale service and support.

Representative CRM vendors:
- SAP
- BroadVision
- E.piphany
- Kana
- Amdocs
- Oracle/Peoplesoft
- Siebel

1-41

No additional notes.

Slide 42

Enterprise Applications - EAI

Enterprise Application Integration (EAI) – the process and technologies used to link applications to support the flow of data and information between those applications.

Middleware – software (usually purchased) used to translate and route data between different applications.

Representative EAI vendors:
- BEA Systems
- IBM (MQSeries)
- Mercator Software
- TIBCO Software

1-42

No additional notes.

Slide 43

Enterprise Application Integration

1-43
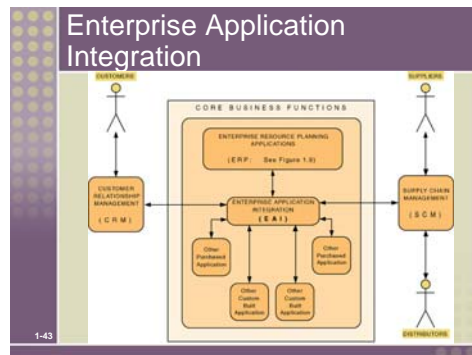
No additional notes.

Slide 44

System Development Process

System development process – a set of activities, methods, best practices, deliverables, and automated tools that stakeholders use to develop and maintain information systems and software.

A general problem-solving approach
1. Identify the problem.
2. Analyze and understand the problem.
3. Identify solution requirements or expectations.
4. Identify alternative solutions and choose the "best" course of action.
5. Design the chosen solution.
6. Implement the chosen solution.
7. Evaluate the results. If the problem is not solved, return to step 1 or 2 as appropriate.

1-44

Teaching Notes
This is not an actual system development life cycle or methodology but simply general problem-solving steps.

Slide 45

A Simple System Development Process

Our Simplified System Development Process	General Problem-Solving Steps
System initiation	1. Identify the problem.
System analysis	2. Analyze and understand the problem. 3. Identify solution requirements or expectations.
System design	4. Identify alternative solutions and choose the "best" course of action. 5. Design the chosen solution.
System implementation	6. Implement the chosen solution. 7. Evaluate the results. If the problem is not solved, return to step 1 or 2 as appropriate.

1-45

Teaching Notes
This relates the problem-solving steps to the classic SDLC phases. Neither of these, though, are a methodology (as will be discussed in chapter 3).

Slide 46

Systems Development Process Overview

1-46

Teaching Notes
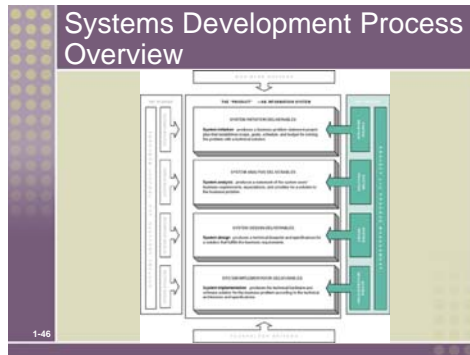This diagram shows the classic SDLC phases, which will be discussed on the next slide.
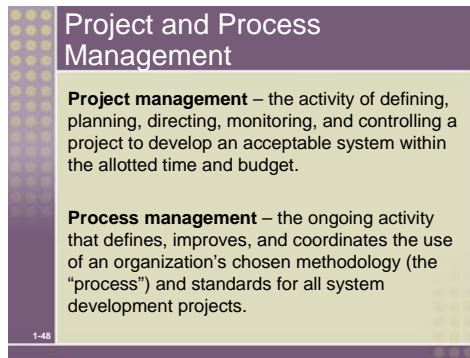
Slide 47

System Development Process Overview

System initiation – the initial planning for a project to define initial business scope, goals, schedule, and budget.

System analysis – the study of a business problem domain to recommend improvements and specify the business requirements and priorities for the solution.

System design – the specification or construction of a technical, computer-based solution for the business requirements identified in a system analysis.

System implementation – the construction, installation, testing, and delivery of a system into production.

1-47

Teaching Notes
This is essentially the traditional System Development Life Cycle (SDLC) without the system support phase. We elected not to use that term because it invokes negative connotation for many instructors. Some associate it with a pure waterfall development approach (which we consider unfair). We differentiate between development and operation (sometimes called production). System support is presented in the 7th edition as a separate project – a maintenance or enhancement project that should follow the exact same problem-solving approach, though on a more limited scale.

Slide 48

Project and Process Management

Project management – the activity of defining, planning, directing, monitoring, and controlling a project to develop an acceptable system within the allotted time and budget.

Process management – the ongoing activity that defines, improves, and coordinates the use of an organization's chosen methodology (the "process") and standards for all system development projects.

1-48

No additional notes

Answers to End of Chapter Questions and Exercises

Review Questions

1. Information systems are essential because they are used to capture, store and manage data to create useful data in an organization. The information can then be used to help an organization make better decisions. In fact, many organizations today use information systems as a tool to gain competitive advantage.

2. Stakeholders are the people who are affected and affect the information system being implemented in an organization. It is important to know who they are because all the stakeholders play a crucial role in the information system. Whether or not your information system can be implemented successfully is largely dependent on the attitudes the stakeholders have towards your information system.

3. System owner(s): the sponsor(s) of an information system. The system owners are usually responsible for finding the funding for building and operating the information system. They set the vision and priorities for the system.

   System users: the employees, customers, suppliers and partners who will use the information system on a regular basis. They are the ones who will set the business requirements for the system.

   Systems designers: the technical specialists who translate system users' business requirements and constraints into technical solutions. Some examples of technical specialists are: database administrators, network architects, web architects, graphic artists, security experts, and technology specialists.

   System builders: the technical specialists who construct information systems and components based on the design specifications generated by the system designers.

   System analysts: the specialists who study the problems and needs of an organization to determine how people, data, processes, and information technology can best accomplish improvements for the business.

   External service providers: systems analysts, system designers, or system builders who sells their expertise and experience to other businesses to help those businesses purchase, develop, or integrate their information systems solutions; they may be affiliated with a consulting or services organization. Some other examples include technology engineers, sales engineers, system consultants, contract programmers, and system integrators.

Project Manager: an experienced professional who accepts responsibility for planning, monitoring, and controlling projects with respect to schedule, budget, deliverables, customer satisfaction, technical standards, and system quality.

4. In order to implement information systems successfully in an organization, having support and advocate from the management is essential. Management has lots of power to affect decisions and issues facing an organization. Because of that, no matter how beneficial your system may be for an organization, without the support from management, your information system will not be able to be implemented in an organization.

5. Internal users are the employees of the organization for which the information system are has been built. Examples include: clerical and service workers, technical and professional staff, supervisors, middle managers, and executive managers.

   External users can be understood as remote user or mobile user because they are not physically located on premises or their location is constantly changing, but still requires access to information systems.   Some examples of external system users are customers, suppliers, partners, and employees.

6. System owners, users, designers, and builders have their own specialties and have very different perspectives on the information system to be built. Thus, there are always gaps between these people.

   On the other hand, system analysts are very different. Their roles overlap the roles of all the other stakeholders. Their job is to close the gaps between the different stakeholders. Therefore, their job is more inclusive.

7. A system analyst should understand both business and information technology. Since system analysts need to fill the gap between the different stakeholders, they need to know the business side of the organization in order to work effectively with system owners and users. They also need to know information technology in order to work with system designers and system builders. The job of a system analyst is to study business problems and opportunities and transform business and information requirements into specifications for information systems. Information systems are of value to business only if they help solve problems or effect improvements.

8. Problem-solving skills
   Interpersonal communication skills
   Interpersonal relations skills
   Flexibility and adaptability

Character and ethics

9. Since system analysts are required to work with a broad range of business and IT stakeholders, they must be able to communicate effectively, both orally and writing. Their communication skills are a critical factor in the success of the project. If they fail to bridge the communications gap between different groups of stakeholders, they are not fulfilling their primary role and the project may fail as a result

10. Globalization of the economy
    Electronic Commerce and Business
    Security and Privacy
    Collaboration and Partnership
    Knowledge Asset Management
    Continuous Improvement and Total Quality Management
    Business Process Redesign

11. E-Commerce is the buying and selling of goods and services by using the Internet.
    E-Business is the use of the Internet to conduct and support day-to-day business   activities.

12. Information is the data that has been processed or reorganized into a more meaningful form for someone. Information is formed from combinations of data that hopefully have meaning to the recipient.

    Knowledge is the data and information that is further refined based on the facts, truths, beliefs, judgments, experiences, and expertise of the recipient.

13. Networks and the Internet
    Mobile and Wireless Technologies
    Object Technologies
    Collaborative Technologies
    Enterprise Applications

14. System initiation: the initial planning for a project to define initial business scope, goals, schedule, and budget.

    System analysis: the study of a business problem domain to recommend improvements and specify the business requirements and priorities for the solution.

    System design: the specification or construction of a technical, computer-based solution for the business requirements identified in a system analysis.

System implementation: the construction, installation, testing, and delivery of the system into production.

15. System initiation is the initial planning for a project to define the business scope, goals, schedule, and budget. Technology will have no value if it does not help improve the business. Thus, it is essential to identify the needs of the business and develop a system based on the needs. In addition to that, information system projects are usually complicated, with multiple dependencies between tasks and resources. They require a significant time, effort, and economic investment; therefore, careful planning in the beginning is needed in order for the project to succeed.

16. The "waterfall" approach assumes that each step in the system development will take place sequentially and that each phase is completed before going on to the next phase.

The iterative or incremental development process has largely replaced the waterfall process. This approach requires completing enough analysis, design, and implementation as is necessary to fully develop a part of the new system and place it into operation as quickly as possible. After such a system is implemented, analysts will get feedback form the system users. Then, additional analysis, design, and implementation will occur in order to release the next version of the system. This iteration will continue until the entire system is implemented.

The advantage of the iterative approach over the waterfall approach is that it allows developers to deliver versions of usable information in regular and shorter time frames, thus increasing system owner and user satisfaction.

Problem and Exercises

1. The internal users of the system might include the cashier, store manager, store owner, salesperson, stock clerks, and the "back office" accounting staff. The external users of the system might include credit card companies, the retail point of sale system vendor, federal and state tax agencies, suppliers and customers.

2. Although there are a number of possible technological solutions, you might recommend an expert system, because it can capture the expertise of skilled workers, such as loan officers, by recognizing logical patterns that are similar to those recognized by humans. The expert system can then employ the same set of business rules, logic and decision points that a loan officer would, and that allow a lower-level employee who does not have the expertise of a loan officer to make accurate and appropriate decisions regarding

most loan applications. Thus, by increasing the number of staff who can process loan applications, the bank may be able to reduce its backlog.

3. Communication and collaboration systems use technology to enhance the efficiency and effectiveness of day-to-day interactions between the stakeholders, both internal and external, of an organization. Some examples of communication and collaboration systems are conferencing systems (instant messaging, video conferencing, teleconferencing, and online bulletin boards and forums), electronic voting systems (to let stakeholder groups vote on issues), and document sharing and tracking systems (such as Microsoft™ Share Point), that replace physical generation and distribution of hardcopy documents for review and comments.

4. Clerical workers perform most of the routine day-to-day activities in an organization. Thus, the type of information systems they would normally be expected to use the most would be transaction processing systems (TPS), which are used for processing orders, generating receipts, preparing invoices, recording payments, and similar other transactional activities.

5. Some of the ethical issues related to information systems include data privacy issues, access to sensitive or confidential information, intellectual property rights, accuracy of information, and social consequences of maintaining certain types of data, such as race or ethnic data.

6. B2C applications are designed and used by businesses to sell products or services directly to consumers. They may or may not have a brick-and-mortar, i.e., physical store(s), presence also. Well-known examples include www.amazon.com, which started as a web-only business and does not have a physical sales presence, and traditional brick-and-mortar stores which have added a website, such as www.sears.com.

   Similarly, businesses may also use B2B applications to target other businesses for their products or services. Examples include information services such as www.gartner.com or industrial supply companies such as www.vikingofficesupply.com

   Some companies may have hybrid applications which target both consumers and businesses. Examples include home and office supply houses such as www.staples.com or high-technology companies such as www.microsoft.com.

7. The four phases of system development process are system initiation, system analysis, system design, and system implementation.

System initiation: Identifying the business problem and conducting the initial high-level planning to define the project scope, goals, schedule, and budget.

System Analysis: Analyzing the business problem in order to understand it, and identifying the business requirements and expectations for resolving the problem.

System design: Identifying alternative solutions, recommending and choosing the most viable solution, and designing the chosen solution.

System implementation: Creating the chosen solution, i.e., constructing, testing, installing, delivering the system into production, and conducting a post-implementation evaluation.

8. The type of integration, or linking diverse applications to support the flow of data and information between these applications, that your company has been asked to do is called **enterprise application integration (EAI).** EAI solutions generally use **middleware** software to translate or convert data into the native formats of different applications. Some examples of middleware vendors and tools that can be used to integrate applications are IBM (MQSeries), BEA Systems, Mercator Software, and TIBCO Software.

9. Although sequential or "**waterfall**" development processes have lost ground to more sophisticated iterative development methodologies in recent years, the waterfall model may still be the most straightforward and fastest approach when the business requirements are clearly known and are not changing from those of the previous system.

10. In this situation, where the company is going down a new road for the first time, you would probably choose an iterative or incremental development for several reasons. The iterative development process uses prototyping to develop a piece of the system at a time, repeating and refining the process each time until all pieces have been built and implemented. The prototyping aspect, through refinement of each subsequent piece, can reduce the risk that the system will not meet the needs of the system owners and users. The incremental approach, by developing a piece of the system at a time on a regular basis, also allows system users to begin using working portions of the system considerably faster than with the waterfall methodology.

11. You explain to your company president that CRM stands for customer relationship management, and that it is a software application that focuses on customers by giving them direct access (generally via the Web) to the company's business functions from initial inquiry through purchasing all the way to post-sales maintenance and support.   It also increases the company's competitive advantage by helping the company build a better database of customers' wants and needs.

12. Mobile and wireless technology represents an enormous change in information systems from those which were designed around desktops in fixed locations. System users are increasingly using and relying upon a wide variety of highly portable, wireless systems. As new information systems are designed and old ones modified, the design must take into consideration whether wireless access is or will be a business need. The system design and technological architecture must also address the very different system requirements of small PDA devices, e.g., limited screen sizes, thumb pad data entry, operating systems which are generally subsets of a desktop operating system, etc.

13. Web services are reusable, web-based programs that can be called from any other internet program. This means a web developer can make use of programs already existing on the internet and/or which are readily available for purchase from third-party vendors. This reduces the development time considerably, and the developer does not need to maintain responsibility for the source code. Some example of the web services are the passport authentication program provided by Microsoft or the address verification program developed by Intelligent Search Technology.

14.   a. System Design
       b. System Initiation
       c. System Implementation
       d. System Analysis

15. The two main advantages of object oriented software over structured software are 1) Objects are reusable. Once developed, objects can be used in multiple applications, reducing the implementation time and cost of future projects. Second, objects are extensible. They can be changed or expanded easily without impacting previously developed applications, which can reduce future system maintenance costs.

Project and Research

1. a. Surveys typically report that of these three categories, systems analysts tend to make the least and system developers the most.

b. There appears to be somewhere around a 30% difference between the system analysts at the bottom and the developers at the top. This can vary by region and other factors.

c. Can list a variety of factors, but should reflect the difference in technical training needed, and the law of supply and demand!

d. Research and surveys tend to indicate a gender gap in salaries of around 10 – 15% still exists, but that this gap has been and continues to narrow as younger IT professionals enter the workforce on an equal footing.

Implications can include a variety of possibilities, but should be well-reasoned and realistic. For example, the response might include the narrowing gap indicates not only that women are achieving salary parity with men in entry-level positions, but also that they are advancing into executive levels where they are in a position to ensure that salary parity exists at all organizational levels.

2. This is an open-ended question. While there is not a specific answer, responses should be consistent with the approaches described in the book. In some cases, a CIO or IT manager may be candid enough to say that their organization does not employ any specific methodology! What is important is the student's ability to research this question through interviews, to frame the responses in terms of the different approaches and methodologies described in the textbook where applicable, and to present a succinct analysis with a well-reasoned discussion of why the student believes a specific approach to be the best one.

3. a. Response can be any of these three.

b. Open-ended, but the response should be well-reasoned, and touch upon tangible reasons (e.g., salary, career advancement), and/or areas of interest (e.g., prefers the technical end of development, enjoys interacting with people, etc).

c. Responses regarding skills and traits for systems analysts, designers and builders should be complete and consistent with the textbook (pages 16-20). Students should also be thoughtful in describing their personal skills and traits, and accurate in mapping them to the appropriate group. For example, mapping "enjoys frequent interaction with business stakeholders" should be mapped to the systems analyst group, not the builder group.

d. No one right answer to the first part of this question, but people tend to be more interested in the types of jobs that are aligned with their per-

sonal strengths. For the second part, answers should be well-reasoned and logical.

4. a.   Response should indicate that the student found significant differences.

b. Response may include a broad range of reasons, but should include awareness that 25 years ago was that systems analysts tended to be IT process-focused, rather than business process-focused. Also, that system development methodologies have matured and increased in number.

c. Response may include a broad range of reasons, but should include the trend in public and private sectors from IT-driven information system development to IT as an enabling technology for business-driven initiatives.

d. No specific answers, but should be imaginative and well-reasoned. An excellent answer would attempt to take the cutting-edge innovations of today and "evolve" them to where they might be in 25 years, while also noting, based upon past looks into the future, how difficult it is to predict the impact upon business of technology that hasn't even been invented yet.

5. Search the Web for several articles and information on ethical issues related to information technology professionals.

a. Open-ended; there are numerous articles in both popular and scholarly publications that are readily available via a web search, and students should not have any problem locating several articles.

b. Response can include a broad range of ethical issues. Answers should be consistent with Figure 1.4, "The Ten Commandments of Computer Ethics." Examples of some of the more common ethical issues faced by systems analysts include engaging in conflicts of interest with contractors by accepting gifts or employment from them, using proprietary business information for personal gain, and using company-owned software for personal use.

c. Open-ended; should be realistic, well-reasoned, explain why it is an ethical issue, and what the student believes to be the ethical, business and legal responsibility of the systems analyst when confronted with the situation.

d. Open-ended; answer should be thoughtful, well-reasoned and believable. Common themes may be "do nothing – it's not my responsibility," "talk

to my friend and tell her/him never to do it again," or "blow the whistle regardless of the consequences.

6. Search the Web or business periodicals in your library such as Forbes Magazine for information on three or four chief information officers of large companies or organizations.

   a. Response is open-ended as to which organizations and CIOs they select.

   b. Response should indicate for each CIO whether experience was in IT, business, or both.

   c. Response should indicate for each CIO level of college degree, if any.

   d. Response to this question may require additional searching, but students should be able to find this information online for CIOs of large organizations

   e. Response can be somewhat open-ended, but should be well-reasoned and logical; at a minimum should indicate leadership and management skills, business knowledge and expertise, and experience in IT.

Minicases

1. Note: Students will usually find that there is active research and development on technologies they envision won't be here until many years in the future. Encourage them to keep abreast of the latest technological news and innovations. The movie clip is meant to support two functions: first to expose them to a presentation media they may not usually utilize, and two to have fun presenting material in front of the class.

2. Note: Opinions on outsourcing vary, and discussion becomes vigorous. Be prepared to guide and shape the conversation to maintain its ability to be productive.

3. There is no answer to this, per say. However, professors should use this case to open a dialogue about ethics in Information Systems. Clearly, we would hope that they would state that they would be truthful and ethical, but obviously ethics does not always take a front seat in business.

4. Answer examples: listening, observing body language, respecting differing views, sharing knowledge (as appropriate) to help the customer understand possibilities, changing terminology to fit client's (technology) background and awareness, etc.

Team and Individual Exercises

1. Advice to Professor: Note that the interaction between persons one and two is very similar to that of the team that designs a system and the team that develops the system – especially in an environment where development is outsourced.

2. There are no answers to this question.

3. There are no answers to this question.

4. There are no answers to this question.