Online Chapter A – The Role of the Systems Analyst

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Chapter Overview

This chapter describes the role of the systems analyst—the nature of the work, the knowledge and skills that are important, and the types of systems and projects that analysts work on.

Information systems (IS) are crucial to the success of modern business organizations. New information systems are constantly being developed to make businesses more competitive. People are attracted to IS careers because information technology can have a dramatic impact on productivity and profits. People develop information system solutions to apply information technology to obtain business benefits.

The analyst's work is defined as organizational problem solving, and the analyst follows a standard problem-solving process. The key to successful system development is thorough systems analysis and design to understand what the business requires from the information system.

This chapter surveys several types of business information systems that are used by organizations today. The information systems listed in the text are the types of systems that IS, MIS, and CIS graduates should be able to develop and deploy.

A systems analyst is a business professional who requires extensive technical, people, and business skills. There are numerous career options for people who have graduated with a degree in information systems. Job titles range from programmer analyst to business consultant to Web developer.

Learning Objectives

After reading this chapter, the student should be able to:

- Explain the key role of a systems analyst in business

- Describe the various types of systems and technologies an analyst might use
- Explain the importance of technical skills, people skills, and business skills for an analyst
- Explain why ethical behavior is crucial for a systems analyst's career
- Describe various job titles in the field and places of employment where analysis and design work is done

Notes on Opening Case and EOC Cases

Opening Case

A Systems Analyst at Consolidated Refineries: This case describes the career of a college graduate in information systems. Mary Wright describes here career as a systems analyst and how she had to learn all about the industry, the company, and company procedures and priorities. In addition, she was involved in all kinds of technical activities to help evaluate options and alternatives for the project. She had anticipated that her career would start as a junior programmer, but instead she became an integral part of the team for fact finding, systems analysis, and defining requirements and specifications.

EOC Cases

Association for Information Technology Professionals Meeting: This case describes some of the methods used by company executives when they interview and hire new college graduates. For example, most companies are interested in the problem solving skills of potential employees. The student is asked to evaluate the discussion of hiring a new employee, especially a college graduate. The students are asked to think about preparing for a career and some of the important issues that they should be thinking about.

Instructor's Notes

Overview Section

Key Terms

- **systems analysis** – the process of understanding and specifying in detail what the information system should accomplish
- **systems design** – the process of specifying in detail how the many components of the information system should be physically implemented
- **systems analyst** – a business professional who uses analysis and design techniques to solve business problems by using information technology

Lecture Notes

The key to successful system development is thorough systems analysis and design to understand what the business requires from the information system. **Systems analysis** means understanding and specifying in detail what the information system should accomplish. **Systems design** means specifying in detail how the many components of the information system should be physically implemented. This text is about systems analysis and design techniques used by a **systems analyst**, a business professional who develops information systems. This online chapter describes the world of the systems analyst—the nature of the work, the knowledge and skills that are important, and the types of systems and special projects an analyst works on.

Quick Quiz

Q: What is the difference between systems analysis and systems design?

> A: Systems analysis is basically understanding and specifying requirements, where systems design is configuring a solution system, i. e. defining the structure of the computer programs.

The Analyst as a Business Problem Solver

Key Terms

none

Lecture Notes

Systems analysts need to know about computers and programming, but they also should know and have a desire to use computers to solve problems. The solution to the "problem" is generally a new information system. Systems analysts solve problems for business organizations, such as the following:

- Problems getting orders from customers twenty-four hours a day.
- Problems planning production amounts to satisfy customer demands.
- Problems reducing inventory holding costs and obtaining supplier discounts.
- Problems anticipating customer needs by tracking buyer trends.
- Problems limiting complete information about the organization's financial position.
- Problems limiting employee flexibility in benefits plans.

A systems analyst uses a generic problem-solving approach. The analyst uses a series of steps to systematically understand and solve the problem. These steps include the following:

1. Research and understand the problem.
2. Verify that the benefits of solving the problem outweigh the costs.
3. Define the requirements for solving the problem.
4. Develop a set of possible solutions (alternatives).
5. Decide which solution is the best, and make a recommendation.
6. Define the details of the chosen solution.

7. Implement the solution.
8. Monitor to make sure the desired results are obtained.

When a new information system will be a solution to a problem, it is important to understand the problem itself. This is the essence of systems analysis—understanding and defining what it takes to solve the problem. A business case must be made for solving the problem—if the benefits don't outweigh the costs, then why should the problem be solved at all?

There are often many alternative solutions that will solve the problem. These solutions must be identified and carefully evaluated. A solution is chosen based on a variety of factors. The best solution has the greatest benefits and the fewest risks. The chosen solution is defined in detail, and then it is implemented. While the new system is being used, it is important to monitor the new system to be sure it is doing what is needed to solve the problem. Over time, the new system will need to be supported and perhaps modified.

Quick Quiz

Q: What is the primary long-term value that an analyst can bring to an organization?

> A: Tools and technologies continually change, but good problem solving skills are always required in every organization.

Systems That Solve Business Problems

Key Terms

- **system** – a collection of interrelated components that function together to achieve some outcome
- **information system** – a collection of interrelated components that collect, process, store, and provide as output the information needed to complete business tasks
- **subsystem** – a system that is part of a larger system
- **functional decomposition** – dividing a system into components based on subsystems that are further divided into smaller subsystems
- **system boundary** – the separation between a system and its environment that inputs and outputs must cross
- **automation boundary** – the separation between the automated part of a system and the manual part of a system
- **customer relationship management (CRM) system** – a system that supports marketing, sales, and service operations involving direct and indirect customer interaction
- **supply chain management (SCM) system** – a system that seamlessly integrates product

development, product acquisition, manufacturing, and inventory management

- **accounting and financial management (AFM) system** – a system that records accounting information needed to produce financial statements and other reports used by investors and creditors
- **human resource management (HRM) system** – a system that supports such employee-related tasks as payroll, benefits, hiring, and training
- **manufacturing management system** – a system that controls internal production processes that turn raw materials into finished goods
- **knowledge management system (KMS)** – a system that supports the storage of and access to documents from all parts of the organization
- **collaboration support system (CSS)** a system that enables geographically distributed personnel to collaborate on projects and tasks
- **business intelligence system** – a system that supports strategic planning and executive decision making
- **enterprise resource planning (ERP)** – a process in which an organization commits to using an integrated set of software packages for key information systems
- **database** – a centrally managed collection of data that is accessible to many users and systems at the same time

Lecture Notes

Information Systems

Although the approach to problem solving presented above can be applied to solving any type of problem, this text is about problems that are solved with information systems. The first part of this section presents many basic concepts that the student should be familiar with. Essentially, the discussion for this section can focus on the key terms and their definitions: **System; Information system; Subsystem; Functional decomposition; System boundary; Automation boundary.**

Types of Information Systems

Various types of information systems are found in business organizations. These systems are often integrated through the use of shared data. The types of systems include the following: **Customer relationship management (CRM) system; Supply chain management (SCM); Accounting and financial management (AFM) system; Human resource management (HRM) system; Manufacturing management system; Knowledge management system (KMS); Collaboration support system (CSS);** and **Business intelligence system.**

In addition, many companies today use **enterprise resource planning (ERP)** systems which incorporate most or all of the functionality of many of the above mentioned systems.

Quick Quiz

Q: What is the difference between a system and a subsystem?

A: A system is an independent entity that runs and executes by itself. Although a subsystem can also be considered a complete entity, it usually functions as a component part of a larger system.

Q: What characteristic makes a software application an information system?

A: Usually we consider software applications whose focus is on receiving, processing, storing, and reporting from information. Normally it an information system is centered around a database to provide information storage and retrieval capabilities.

Q: What is the difference between the system boundary and the automated system boundary?

A: The automated system boundary is defined as those boundary points where information goes into the computer system, i.e., the software application. The boundary around the total system may include manual processes that occur before the information is actually entered into the computer.

Required Skills of the Systems Analyst

Key Terms

- **tools** – a software application that assists developers in creating models or other components required for a project
- **techniques** – strategies for completing specific system development activities

Lecture Notes

Technical Knowledge and Skills

These are the most obvious areas of expertise: computers, peripheral devices, communications networks, connectivity, databases, programming languages, and operating systems. Analysts also use tools and techniques to build systems.

Tools are software products that are used to develop analysis and design specifications and completed system components. Examples include development packages (such as Microsoft Access, Oracle Developer, and IBM Websphere Studio), integrated development environments (IDEs), computer-aided system engineering (CASE) tools, program code generators, documentation support tools, testing tools, and project management tools.

Techniques are strategies for completing specific system development activities. Examples include project planning techniques, cost/benefit analysis techniques, interviewing techniques, requirements modeling techniques, architectural design techniques, network configuration techniques, and database design techniques.

Business Knowledge and Skills

Systems analysts need to understand business organizations and how they operate. It is important to understand how organizations are structured and managed in addition to understanding the business functions that are performed in finance, accounting, manufacturing, marketing, human resources, and customer service.

It is also important to understand the specific organization involved. What does it do? What makes it successful? What are its strategies and plans? What are its traditions and values? A system solution is tailored specifically for the needs of a specific organization.

People Knowledge and Skills

Because systems analysts often work on development teams with other employees, they need to understand a lot about people and possess many interpersonal skills. Analysts need to understand how people think, learn, react to change, communicate, and work in a variety of jobs and levels.

A Few Words about Integrity and Ethics

It is also important for systems analysts to recognize the importance of ethical behavior. They are trusted with private information, such as salary, health, and job performance information. They might also work with confidential corporate information about products, strategic plans, business tactics, and security systems and processes.

Quick Quiz

Q: What is the primary difference between tools and techniques?

> A: Tools are software products, e.g. things that are used. Techniques are strategies, e.g. methods or ways, for completing development tasks or deliverables.

Q: List the six fundamental technologies an analyst needs to understand.

> A: Computers, devices that interact with computers, communication networks, databases and database management systems, programming languages, and operating systems/utilities.

Q: How can an individual's lack of integrity or ethics impact an organization? Describe some current examples of unethical behavior.

> A: An organization can be impacted when trade secrets or customers are lost. Financial organizations, such as banks and insurance companies, can have major losses if employees are unethical. Examples include Enron, Arthur Anderson, and the New York Times.

Analysis-Related Careers

Key Terms

none

Lecture Notes

Rapid changes in technology, business practices, and the structure of the global economy have changed related jobs. Typical information system graduates of the late twentieth century were employed as programmer analysts. Job tasks consisted primarily of programming with some analysis and design. The employment picture is much more complex in the twenty-first century. The number and nature of the jobs, their titles, and the organizations that fill those positions are much more complex than in the past.

Changes in software development, technology, and business practices have created many new career opportunities for analysts, including:

- Sales and support of ERP software
- Business analysts for user organizations
- Auditing, compliance, and security
- Web development

People doing systems analysis and design work have many different job titles. Sometimes analysis and design work is only a part of their job responsibilities. Sometimes systems analysts also manage the project and are referred to as project leaders or project managers. Other job titles include:

- Programmer analyst
- Business systems analyst
- System liaison
- End-user analyst
- Business consultant
- Systems consultant
- Systems support analyst
- Systems designer
- Software engineer
- System architect
- Webmaster
- Web developer

The career prospects for analysts are bright, but the nature of related jobs, their location, and the typical career development path for analysts and other information system professionals has changed significantly over the last two decades.

Quick Quiz

Q: List ten job titles that involve systems analysis and design work.

A: Programmer analyst, business systems analyst, system liaison, end-user analyst, business consultant, systems consultant, systems support analyst, systems designer, software engineer, system architect, Webmaster, and Web developer. The following titles might also be used: project leader, project manager, lead analyst, team lead, and chief architect.

Q: Based on the diversity of titles, do titles have any meaning or relevant value?

A: Titles have less importance than the role and nature of the work.

Classroom Activities

Students are also extremely interested in employment opportunities and careers. Frequently there are students in the class that currently have information systems jobs and can explain some of the duties and responsibilities associated with their jobs. You could also bring information about past graduates and what kinds of jobs they obtained. It is always a fun activity to look at some employment websites for information systems type of jobs. Before class, do some searches on the job listing websites for several of the job "titles" listed in the chapter. You can bookmark those pages for quick access in the classroom. Also allow the students to find other job search websites. It is a dynamic, changing field.

http://www.monster.com/

http://www.employment.com/

http://www.jobs.com/

http://www.jobs.net/

Troubleshooting Tips

Students frequently struggle with understanding how titles, roles, and responsibilities compare. Point out to students that organizational and project responsibilities are fluid and may change frequently depending on business needs. The role and responsibilities of the systems analyst will change with the project phases of planning, analysis, design, and implementation.

It is also important to emphasize that the developer may have a preference regarding development languages and technology platforms, but the systems analyst should resist being influenced by implementation decisions and technical details. The systems analyst needs to take a high-level view and focus on understanding the business problem completely before considering the technology details that are needed to solve that problem.

Similarly, the applications architecture plan and the technology architecture plan are separate documents that support first an analysis view and then a design view to offer a complete problem definition. The RMO information systems strategic plan can be effectively used to describe the differences between the applications architecture plan and the technology architecture plan and to explain why both documents are necessary.

Discussion Questions

1. Discussion on Systems that Solve Problems

Consider that information systems solve business problems. Many students today don't fully appreciate what it was like before automated information systems. Discuss some current systems to explore what the problems were before they were implemented. Start with a widely used system, and then talk about what it was like in the "old days." The discussion should help students see that all systems were developed to solve problems. The examples provided below may lead students to consider whether the problems still remain.

A. **Telephone system**: Now the user can dial directly anywhere in the world. In the old days, however, thousands of calls came in to a switchboard, and telephone operators had to patch them through. Users faced delays and errors, phone operators were swamped with work, and the cost of servicing customers was high. In addition, it was difficult to accurately bill customers for the calls, and the ability to increase the capacity for the number of phone calls made was limited. At one point, the problem was so serious that phone company management projected that the number of operators would eventually grow to exceed the population of the United States. Indeed, that did happen as we are all phone operators now. The solution? Automate the switchboard, and let users place their own calls.

B. **Payroll system**: Now net pay is automatically deposited in the employee's bank account. What happened in the old days?

C. **Savings accounts**: Now we get a monthly statement summarizing all deposits (including interest payments) and withdrawals (including online account transfers). What happened in the old days?

D. **Stock trades**: now we trade shares of stock directly over the Internet and get monthly transaction summaries from the broker. What happened in the old days?

E. **Applying for a mortgage loan**: Now we give our social security numbers to lenders, and they verify credit and employment and approve the loan in minutes. What happened in the old days?

F. **Checking out a book from the library**: Now we hold the book and our card under a scanner as we walk out and get an email reminder when it is time to return the book. What happened in the old days?

G. **Buying a book**: Now we log on to a Web site, place an order, pay by credit card, and receive the book the next day. What happened in the old days?

H. **Paying taxes**: Now we simply wait until April 15, and the government sends us a complete statement that provides the details of the taxes we paid the prior year through payroll deductions and direct access to our savings account if required. What happened in the old days? (Or is there still a problem to be solved?)

I. **University application system**: Now we apply online and are told if we are accepted right away. What happened in the old days? (Or is there still a problem to be solved?)

J. **University financial aid system**: Now we apply online and are awarded financial aid right away. What happened in the old days? (Or is there still a problem to be solved?)

K. **Student course enrollment system**: Now we enroll in courses directly through the Internet and have our tuition charged directly to our account each time we add a course. What happened in the old days? (Or is there still a problem to be solved?)

L. **University course scheduling system**: Now each department draws on past enrollment statistics, student demographics, and projections from the database and accurately plans and schedules the correct number of course sections to be offered. What happened in the old days? (Or is there still a problem to be solved?)

2. Discussion on Approach to Problem Solving

The approach to problem solving discussed in this chapter applies to solving any problem. Ask the class to discuss how each step could be followed to plan the Drama Club's annual party.

First, discuss with everyone what they think the general requirements for the party should be, such as day of week and time of day, length, number of attendees expected, expectations for a meal or refreshments, expectations for entertainment, whether faculty are expected to attend, working budget, whether attendees are expected to pay, and so on.

Next, determine whether the expectations of the party can be met given the budget. If not, you better go back and redefine what the expectations are!

Develop a list of alternatives that would meet the expectations of when, where, and how to do the party. Decide which alternative is best. What are some criteria for deciding which alternative is best? Convenience? Cost? Publicity?

Work out the details of the chosen alternative, and make it happen: hire a specific band, book the room, work out the menu with the caterer, design the advertising fliers and posters, pick the color scheme, and so on.

During the party (and after), make sure everything turns out as planned. If there are problems, fix them! Be sure to report back to the club how everything went, and document it all so next year's team will be able to do a better job.

3. Discussion on Required Skills of the Systems Analysts

A systems analyst needs a variety of technical, business, and people skills. Describe undergraduate courses that future systems analysts should be taking during their academic careers. How will these courses specifically help the analysts in their future professional lives?

Some of this work has already been done or is implicit in the student's course catalog for major and minor programs. However, this discussion is beneficial to help the students appreciate and look for the value in courses that are not included in their core courses. Occasionally, students focus on just technical skills, and this discussion will help them look for opportunities to apply learned skills in other areas. For example, business communication and speech courses help students develop and improve communication skills. Other liberal arts courses, such as creative writing and English, provide fundamental skills.

Another thread for discussion is related to the types of organizations that students may be analyzing or working for in the future. Physics, chemistry, music, art, nursing, and education are some fields where a systems analyst might be qualified to solve problems. Consultants frequently find themselves at different organizations or entirely different industries every three to six months. A consulting analyst could go from a hospital, to a bank, to an insurance company, to an educational institution, to a manufacturing company, and so on. For this type of person, a diverse educational background is very valuable.