

## Modern Systems Analysis and Design

### Succeeding as a Systems Analyst

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## Learning Objectives

- ✓ Discuss the analytical skills, including systems thinking, needed for a systems analyst to be successful
- ✓ Describe the technical skills required of a systems analyst
- ✓ Discuss the management skills required of a systems analyst
- ✓ Identify the interpersonal skills required of a systems analyst
- ✓ Describe the systems analysis profession

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## Analytical Skills for Systems Analysis

- ◆ Four Sets of Analytical Skills
  - Systems Thinking
  - Organizational Knowledge
  - Problem Identification
  - Problem Analyzing and Solving

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## Systems Thinking

- ◆ System
  - A system is an interrelated set of business procedures used within one business unit working together for a purpose
  - A system has nine characteristics
  - A system exists within an environment
  - A boundary separates a system from its environment

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## Systems Thinking

- ◆ Characteristics of a System
  - Components
  - Interrelated Components
  - Boundary
  - Purpose
  - Environment
  - Interfaces
  - Input
  - Output
  - Constraints

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## Systems Thinking

- ◆ Important System Concepts
  - Decomposition
    - ◆ The process of breaking down a system into smaller components
    - ◆ Allows the systems analyst to:
      - Break a system into small, manageable subsystems
      - Focus on one area at a time
      - Concentrate on component related to one group of users
      - Build different components at independent times

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## Systems Thinking

- ◆ Important System Concepts (Continued)
  - Modularity
    - Process of dividing a system into modules of a relatively uniform size
    - Modules simplify system design
  - Coupling
    - Subsystems that are dependent upon each other are coupled
  - Cohesion
    - Extent to which a subsystem performs a single function

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## Systems Thinking

- ◆ Important System Concepts (Continued)
  - Logical System Description
    - Portrays the purpose and function of the system
    - Does not tie the description to a specific physical implementation
  - Physical System Description
    - Focuses on how the system will be materially constructed

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## Systems Thinking

- ◆ Benefits
  - Identification of a system leads to abstraction
  - From abstraction you can think about essential characteristics of specific system
  - Abstraction allows analyst to gain insights into specific system, to question assumptions, provide documentation and manipulate the system without disrupting the real situation

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## Systems Thinking

- ◆ Applying Systems Thinking to Information Systems
  - Information systems are subsystems in larger organizational systems
  - Data flow diagrams represent information systems as systems
    - Inputs
    - Outputs
    - System boundaries
    - Environment
    - Subsystems
    - Interrelationships

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## Organizational Knowledge

- ◆ Understanding of how organizations work
- ◆ Knowledge of specific functions and procedures of organization and department
- ◆ How work officially gets done
- ◆ Internal policies
- ◆ Competitive and Regulatory Environment
- ◆ Organizational Strategies and Tactics

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## Problem Identification

- ◆ Problem: Difference between an existing situation and a desired situation
- ◆ Identification is process of defining differences
- ◆ Differences are defined by comparing the current situation to the output of a model that predicts what the output should be

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## Problem Analyzing and Solving

### ◆ Four Phases

- Intelligence
  - ◆ All relevant information is collected
- Design
  - ◆ Alternatives are formulated
- Choice
  - ◆ Best alternative solution is chosen
- Implementation
  - ◆ Solution is put into practice

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## Technical Skills for Systems Analysis

- ◆ Constant re-education is necessary as technology changes rapidly
- ◆ Activities to keep skills up-to-date
  - Trade publications
  - Professional societies
  - Attend classes or teach at a local college
  - Attend courses sponsored by organization
  - Conferences and trade shows
  - Browse Websites
  - Participate in new groups and conferences

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## Technical Skills for Systems Analysis

- ◆ Understanding of a wide variety of technologies is required
  - Microcomputers, workstations, minicomputers and mainframe computers
  - Programming languages
  - Operating systems
  - Database and file management systems
  - Data communication standards
  - Systems development tools and environments
  - Web development languages and tools
  - Decision support system generators

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## Management Skills for Systems Analysis

- ◆ Four categories
  - Resource Management
  - Project Management
  - Risk Management
  - Change Management

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## Resource Management

- ◆ Systems analyst needs to know how to get the most out of the resources of an organization, including team members
- ◆ Includes the following capabilities
  - Predicting resource usage
  - Tracking resource consumption
  - Effective use of resources
  - Evaluation of resource quality
  - Securing resources from abusive use
  - Relinquishing resources when no longer needed

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## Project Management

- ◆ Two Goals
  - Prevent projects from coming in late
  - Prevent projects from going over budget
- ◆ Assists management in keeping track of project's progress
- ◆ Consists of several steps
  - Decomposing project into independent tasks
  - Determining relationships between tasks
  - Assigning resources and personnel to tasks

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## Risk Management

- ◆ Ability to anticipate what might go wrong in a project
- ◆ Minimize risk and/or minimize damage that might result
- ◆ Placement of resources
- ◆ Prioritization of activities to achieve greatest gain

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## Change Management

- ◆ Ability to assist people in making transition to new system
- ◆ Ability to deal with technical issues related to change
  - Reusability

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## Interpersonal Skills for Systems Analysis

- ◆ Mastery of interpersonal skills is paramount to success as a Systems Analyst
- ◆ Four types of skills:
  - Communication skills
  - Working alone and with a team
  - Facilitating groups
  - Managing expectations

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## Communication Skills

- ◆ Effective communication helps to establish and maintain good working relationships with clients and colleagues
- ◆ Skills improve with experience
- ◆ Three types used by Systems Analyst
  - Interviewing and Listening
  - Questionnaires
  - Written and Oral Presentations

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## Interviewing and Listening

- ◆ Means to gather information about a project
- ◆ Listening to answers is just as important as asking questions
- ◆ Effective listening leads to understanding of problem and generates additional questions

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## Questionnaires

- ◆ Advantages:
  - Less costly than interviews
  - Results are less biased due to standardization
- ◆ Disadvantages
  - Less effective than interviews due to lack of follow-up

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## Written and Oral Presentations

- ◆ Used to document progress of project and communicate this to others
- ◆ Communication takes several forms:
  - Meeting agenda
  - Meeting minutes
  - Interview summaries
  - Project schedules and descriptions
  - Memoranda requesting information
  - Requests for proposals from vendors and contractors
  - Oral presentations

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## Steps to Improving Communication Skills

- ◆ Practice
  - Conduct a training class
  - Volunteer to speak
- ◆ Videotape presentation and do a self-appraisal of your skills
- ◆ Make use of college writing centers
- ◆ Take classes on business and technical writing

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## Working Alone and with a Team

- ◆ Working alone on aspects of project involves managing:
  - Time
  - Commitments
  - Deadlines
- ◆ Team work involves establishing standards of cooperation and coordination

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## Facilitating Groups

- ◆ Involves guiding a group without being a part of the group

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## Managing Expectations

- ◆ Managing expectations is directly related to successful system implementation
- ◆ Skills for successful expectation management
  - Understanding of technology and workflows
  - Ability to communicate a realistic picture of new system to users
  - Effective education of management and users throughout systems development life cycle

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## Systems Analysis as a Profession

- ◆ Standards have been established for education, training, certification and practice
- ◆ Several aspects:
  - Standards of Practice
  - Ethics
  - Career Paths

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## Standards of Practice

- ◆ Endorsed Development Methodology
  - Specific procedures and techniques to be used during development process
  - Promote consistency and reliability across all of an organization's development projects
- ◆ Approved Development Platforms
  - Organizations standardize around a specific platform, sometimes tied to development methodology

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## Standards of Practice

- ◆ Standardization of Roles
  - Roles are becoming better defined across organizations
- ◆ Development of a Common Language
  - Common programming languages
  - Common modeling languages, such as Unified Modeling Language (UML), Data Modeling, Process Modeling Languages

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## Ethics

- ◆ Professional Ethics
  - ACM Code of Ethics – Assignment
- ◆ Business Ethics
  - Stockholder approach
    - Any action taken by a business is acceptable as long as it is legal and maximizes stockholder profit
  - Stakeholder approach
    - Any action that violates rights of stakeholder must be rejected
  - Social Contract approach
    - Any action that is deceptive, can dehumanize employees or that could discriminate is rejected

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## Career Paths

- ◆ Consulting
- ◆ Information Systems within a large corporation
- ◆ Software vendors
- ◆ Other opportunities outside of systems analysis

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## Summary

- ◆ Skills of Successful Systems Analyst
  - Analytical
    - Systems Thinking
  - Technical
    - Change over time
    - Programming Languages
    - Operating Systems
    - Database Management Systems
    - Data Communications
    - Systems Development Techniques

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## Summary

- ◆ Skills of a Successful Systems Analyst (Continued)
  - Management
    - Resources
    - Projects
    - Risk
    - Change

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## Summary

### ◆ Skills of a Successful Systems Analyst (Continued)

- Interpersonal
  - ◆ Interviews and Questionnaires
  - ◆ Written and Oral Presentations
  - ◆ Facilitating Groups

### ◆ Systems Analysis as a Career

- Standards of Practice
- Ethics
- Career Paths

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