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Chapter 4:
Beginning the Analysis:
Investigating System Requirements

Systems Analysis and Design in a Changing World, 3rd Edition

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Learning Objectives

- Describe the activities of the systems analysis life cycle phase
- Explain the effect of business process reengineering on activities of the analysis phase
- Describe the difference between functional and nonfunctional system requirements
- Identify and understand the different types of users who will be involved in investigating system requirements

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Learning Objectives (continued)

- Describe the kind of information that is required to develop system requirements
- Determine system requirements through review of documentation, interviews, observation, prototypes, questionnaires, vendor research, and joint application design sessions
- Discuss the need for validation of system requirements to ensure accuracy and completeness and the use of a structured walkthrough

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Overview

- Analysis phase of SDLC skills needed:
  - Fact-finding for investigation of system requirements
  - Analyst should learn details of business processes and daily operations
  - Analyst should become as knowledgeable as business domain users to build credibility
  - Analyst brings fresh perspective to problem
  - Modeling of business processes based on system requirements

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The Analysis Phase in More Detail

- Gather information
- Define system requirements
  - Logical model and physical model
- Prioritize requirements
- Prototype for feasibility and discovery
- Generate and evaluate alternatives
- Review recommendations with management

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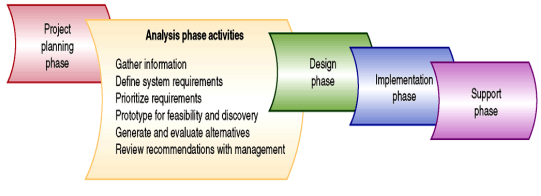
The Activities of the Analysis Phase

FIGURE 4-1
The activities of the analysis phase.



Activities of the Analysis Phase and Their Key Questions

FIGURE 4-2
The activities of the analysis phase and their key questions.

Analysis phase activities	Key questions
Gather information	Do we have all of the information (and insight) we need to define what the system must do?
Define system requirements	What (in detail) do we need the system to do?
Prioritize requirements	What are the most important things the system must do?
Prototype for feasibility and discovery	Have we proven that the technology proposed can do what we think we need it to do? Have we built some prototypes to ensure the users fully understand the potential of what the new technology can do?
Generate and evaluate alternatives	What is the best way to create the system?
Review recommendations with management	Should we continue and design and implement the system we propose?

Business Process Reengineering and Analysis

- Fundamental strategic approach to organizing company
- Streamlines internal processes to be as efficient and effective as possible
- Questions basic assumptions for doing business and seeks to find a better way
- Uses IT as BPR enabler
- Systems analyst may discover opportunities for process improvement
- Any project may include components of BPR

System Requirements

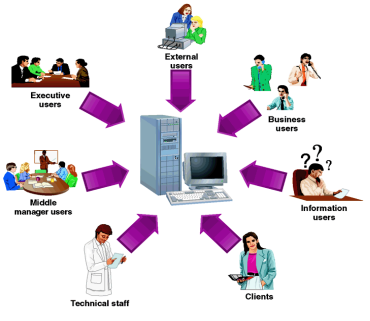
- New system capabilities and constraints
- Functional requirements are:
  - Activities system must perform
  - Based on procedures and business functions
  - Documented in analysis models
- Nonfunctional requirements include:
  - Operating environment or performance objectives
  - Usability, reliability, and security requirements

Stakeholders – The Source of System Requirements

- People with interest in successful system implementation
- Three primary groups of stakeholders:
  - Users (use system)
  - Clients (pay for and own system)
  - Technical staff (ensure system operation)
- Every type of stakeholder is identified by analyst

Stakeholders Interested in New System Development

FIGURE 4-3
Stakeholders with an interest in new system development.



Users as Stakeholders

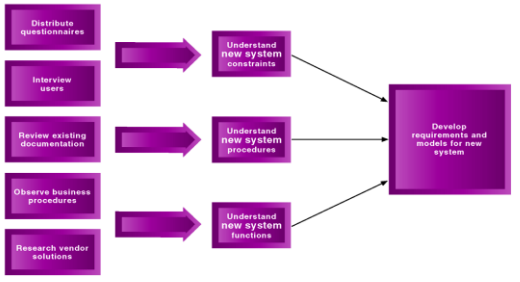
- Horizontal user roles - information flow across departments
- Vertical user roles - information needs of clerical staff, middle management, and senior executives
  - Business users perform day-to-day operations
  - Information users need current information
  - Management users need summary information
  - Executive users need strategic information
  - External users may have access to system

Techniques for Information Gathering

- Analysis phase done to understand business functions and develop system requirements
- Original structured approach
  - Create model of existing system
  - Derive requirements from existing system model
- Current approach
  - Identify logical requirements for new system
  - Balance the review of current business functions with new system requirements

Information Gathering and Model Building

FIGURE 4-5
The relationship between information gathering and model building.



Themes for Information-Gathering Questions

FIGURE 4-6
Themes for information-gathering questions.

Theme	Questions to users
What are the business operations and processes?	What do you do?
How should those operations be performed?	How do you do it? What steps do you follow?
What information is needed to perform those operations?	What information do you use? What forms or reports do you use?

Fact Finding Methods

- Review existing reports, forms, and procedure descriptions
- Interview and discussion processes with users
- Observe and document business processes
- Build prototypes
- Distribute and collect questionnaires
- Conduct joint application design (JAD) sessions
- Research vendor solutions

Review Existing Reports, Forms, and Procedure Descriptions

- Source: External industry wide professional organizations and trade publications
- Source: Existing business documents and procedure descriptions within organization
  - Identify business rules, discrepancies, and redundancies
  - Be cautious of outdated material
  - Obtain preliminary understanding of processes
  - Use as guidelines / visual cues to guide interviews

Sample Order Form for RMO

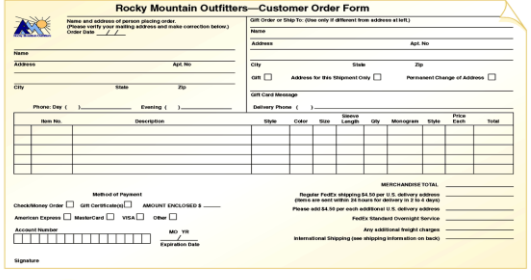

Rocky Mountain Outfitters—Customer Order Form

FIGURE 4-7
A sample order form for Rocky Mountain Outfitters.

Conduct Interviews and Discussions with Users

- Effective way to understand business functions and rules
- Time-consuming and resource-expensive
- May require multiple sessions to:
  - Meet all users
  - Understand all processing requirements
- Can meet with individuals or groups of users
- List of detailed questions prepared

Sample Checklist to Prepare for User Interviews

FIGURE 4-8
A sample checklist to prepare for user interviews.

Checklist for Conducting an Interview

Before
- ☐ Establish the objective for the interview
- ☐ Determine correct user(s) to be involved
- ☐ Determine project team members to participate
- ☐ Build a list of questions and issues to be discussed
- ☐ Review related documents and materials
- ☐ Set the time and location
- ☐ Inform all participants of objective, time, and locations

During
- ☐ Dress appropriately
- ☐ Arrive on time
- ☐ Look for exception and error conditions
- ☐ Probe for details
- ☐ Take thorough notes
- ☐ Identify and document unanswered items or open questions

After
- ☐ Review notes for accuracy, completeness, and understanding
- ☐ Transfer information to appropriate models and documents
- ☐ Identify areas needing further clarification
- ☐ Send thank-you notes if appropriate

A Sample Open-items List

OUTSTANDING ISSUES CONTROL TABLE

ID	Issue Title	Date Identified	Target End Date	Responsible Project Person	User Contact	Comments
1	Partial Shipments	6-12-2005	7-15-2005	Jim Williams	Jason Nadold	Ship partials or wait for full shipment?
2	Return and Commissions	7-01-2005	9-01-2005	Jim Williams	William McDougal	Are commissions recouped on returns?
3	Extra Commissions	7-01-2005	8-01-2005	Mary Ellen Green	William McDougal	How to handle commissions on special promotions?

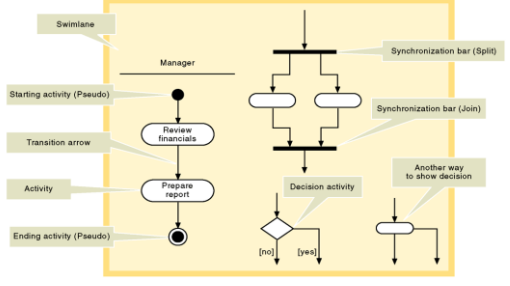
FIGURE 4-10
A sample open-items list.

Observe and Document Business Processes

- Varies from office walkthrough to performing actual tasks
- Not necessary to observe all processes at same level of detail
- May make users nervous, so use common sense
- May be documented with workflow (activity) diagrams

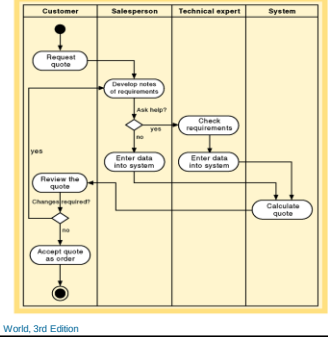
Activity Diagram Symbols

FIGURE 4-11
Activity diagram symbols.



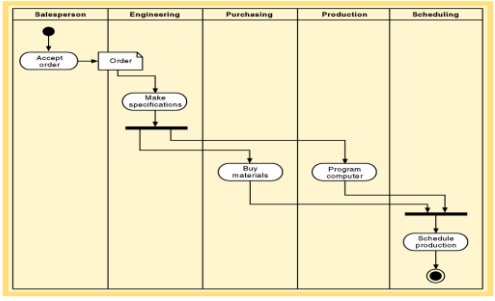
Simple Activity Diagram to Demonstrate a Workflow

FIGURE 4-12
A simple activity diagram to demonstrate a workflow.



Activity Diagram Showing Concurrent Paths

FIGURE 4-13
An activity diagram showing concurrent paths.



Build Prototypes

- Preliminary working model of a larger, more complex system
  - Discovery, design, evolving prototypes
- Operative
  - Working model to provide “look and feel”
- Focused to accomplish single objective
- Quick
  - Built and modified rapidly with CASE tools

Distribute and Collect Questionnaires

- Limited and specific information from a large number of stakeholders
- Preliminary insight into business
- Not well suited for gathering detailed information
- Closed-ended questions direct person answering question
- Open-ended questions encourage discussion and elaboration

Conduct Joint Application Design Sessions

- Expedite investigation of systems requirements
- Seeks to compress fact-finding, modeling, policy formation, and verification activities into shorter time frame
- Critical factor is to have all important stakeholders present

Joint Application Design Participants

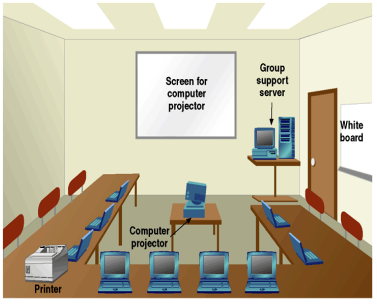
- Session leader trained in group dynamics and JAD group facilitation
- Knowledgeable business and system users
- Policy making managers
- Technical staff representatives to handle:
  - Computer and network configurations
  - Operating environments
  - Security issues
- Project team members

Joint Application Design Facilities

- Conducted in special room
  - Limit interruptions
  - May be off-site
- Resources
  - Overhead projector, white board, flip charts, work material
  - Electronic support (Laptops)
  - CASE Tools
  - Group support systems (GSS)

A JAD Facility

FIGURE 4-15
A JAD facility.



Research Vendor Solutions

- Many problems have been solved by other companies
- Positive contributions of vendor solutions
  - Frequently provide new ideas
  - May be state of the art
  - Cheaper and less risky
- Danger
  - May purchase solution before understanding problem

Useful Techniques in Vendor Research

- Technical specifications from vendor
- Demo or trial system
- References of existing clients
- On-site visits
- Printout of screens and reports

Validating the Requirements

- Make sure gathered information is correct
- Structured walkthrough
  - Effective means of implementing quality control early in project
  - Verify and validate system requirements
  - Review of findings from investigation and of models based on findings
- Project manager responsible for system quality
  - System analyst, project manager are partners

Summary

- Analysis Phase Activities
  - Gather information
  - Define system requirements
  - Prioritize requirements
  - Prototype for feasibility and discovery
  - Generate and evaluate alternatives
  - Review recommendations with management
- BPR is becoming widespread and can affect analysis phase

Summary (continued)

- Gathering system requirements
  - Functional and Nonfunctional
  - Work with various stakeholders (users, clients, technical staff)
- "What kind of information do I need?"
  - What are the business processes and operations?
  - How are the business processes performed?
  - What are the information requirements?

Summary (continued)

- Primary information gathering techniques
  - Review existing reports, forms, and procedure descriptions
  - Conduct interviews and discussions with users
  - Observe and document business processes
  - Build prototype working models
  - Distribute and collect questionnaires
  - Conduct JAD sessions
  - Research vendor solutions