MSc Information Systems

Planning – II

Requirements Analysis

Module SITS code: COIY059H7

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Introduction

- Requirements determination is the single most critical step of the entire SDLC
- Most (>50%) system failures are due to problems with requirements
- It is usually very hard for customers/users to describe the requirements of a new system
- Changes can be made easily in this stage

Requirements Analysis Phase

- Purpose: to convert high level business requirements into detailed requirements that can be used as inputs for creating models

- What is a requirement?
  - A statement of what the system must do or a characteristic it must have
  - Evolves into a technical description of how the system will be built

- Types:
  - **Functional**: relates to a process or data (FRs) – may be prioritised
  - **Non-functional:** relates to performance or usability (NFRs)

- Together the FR and NFRs define the scope of the system

How To Determine A Requirement

- Root cause analysis
- Duration analysis
- Activity-based costing
- Informal benchmarking
- Outcome analysis
- Technology analysis
- Activity elimination

Business Process Automation

- leaves the basic way in which the organisation operates unchanged and uses computer technology to do some of the work
- low risk, but low payoff
- planners in BPA projects invest time in understanding the as-is system using:
  - Problem analysis
  - Root cause analysis

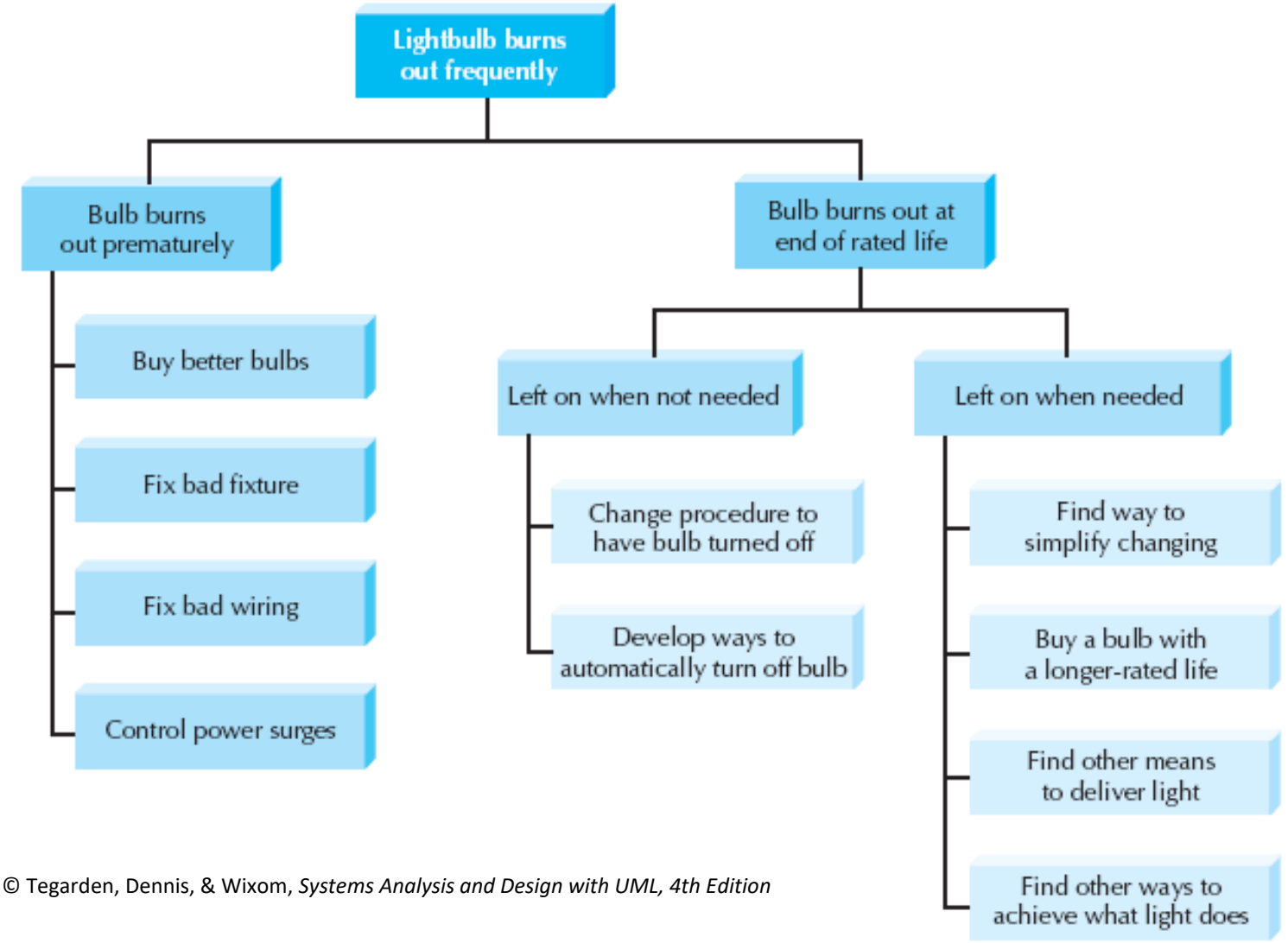
Problem Analysis

- users and managers identify problems with the as-is system and describe how to solve them in the to-be system
- tends to solve problems rather than capitalize on opportunities
- improvements tend to be small and incremental

Root Cause Analysis

- users are not asked to identify solutions
- users are asked to identify and prioritise known problems, and to provide root causes for these
- analysts then investigate each root cause to find solutions for the highest priority problems and root causes that are common to multiple problem

Root Cause Analysis Example



Business Process Improvement (BPI)

- makes moderate changes to the way in which the organisation operates to take advantage of new technology or to copy what competitors are doing

- common activities include duration analysis, activity-based costing and benchmarking

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- Duration analysis
  - Assess time required to complete each step in process and compare with time for entire process
  - Large differences suggest problems that might be solved by integrating steps or performing steps simultaneously
- Activity-based costing
  - Same as duration analysis but applied to costs
- Informal benchmarking
  - Analyses similar processes in other successful organisations

Business Process Re-Engineering (BPR)

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- Outcome analysis: what does the customer want in the end?
- Technology analysis: how can new technology perform process better?
- Activity elimination: if we eliminate each activity, what happens?

Selecting The Appropriate Strategy

	Business Process Automation	Business Process Improvement	Business Process Reengineering
Potential benefit	Low–moderate	Moderate	High
Project cost	Low	Low–moderate	High
Breadth of analysis	Narrow	Narrow-moderate	Very broad
Risk	Low–moderate	Low–moderate	Very high

How To Determine a Requirement

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- Best determined by systems analysts ***and*** business people together

- Common techniques include:
  - Interviews, questionnaires and/or observation
  - Joint application development (JAD)
  - Document analysis

Challenges

- Analyst may not have access to the correct users
- Requirements specifications may be inadequate
- Some requirements may not be known in the beginning
- Verifying and validating requirements can be difficult

Requirements Gathering Techniques

- Interviews
- Joint Application Development (JAD)
- Questionnaires
- Document analysis
- Observation

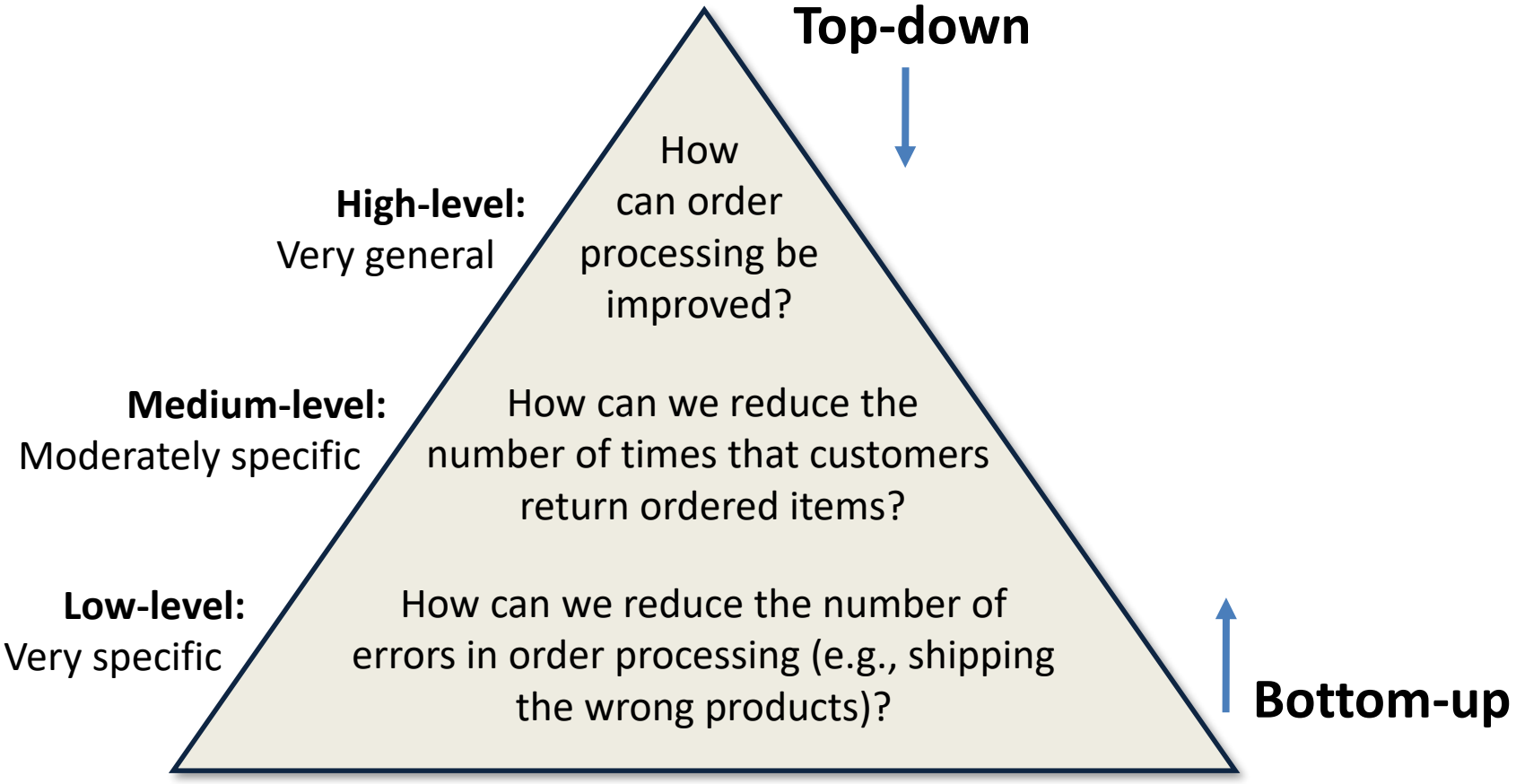
Interviews

- Most popular method
- Select people to interview and create a schedule
- Design interview questions (open-ended, closed-ended, probing questions)
- Prepare for the interview (unstructured vs. structured interview)
- Conduct the interview (top-down vs. bottom-up)
- Follow-up after the interview

Types of Interview Questions

Types of Questions	Examples
Closed-ended questions	• How many telephone orders are received per day? • How do customers place orders? • What information is missing from the monthly sales report?
Open-ended questions	• What do you think about the current system? • What are some of the problems you face on a daily basis? • What are some of the improvements you would like to see in a new system?
Probing questions	• Why? • Can you give me an example? • Can you explain that in a bit more detail?

Interview Approach



Post-interview Follow Up

Interview Notes Approved by: Linda Estey

Person Interviewed: Linda Estey,
Director, Human Resources

Interviewer: Barbara Wixom

Purpose of Interview:

- Understand reports produced for Human Resources by the current system
- Determine information requirements for future system

Summary of Interview:

- Sample reports of all current HR reports are attached to this report. The information that is not used and missing information are noted on the reports.
- Two biggest problems with the current system are:
  1. The data are too old (the HR Department needs information within two days of month end; currently information is provided to them after a three-week delay)
  2. The data are of poor quality (often reports must be reconciled with departmental HR database)
- The most common data errors found in the current system include incorrect job level information and missing salary information.

Open Items:

- Get current employee roster report from Mary Skudrna (extension 4355).
- Verify calculations used to determine vacation time with Mary Skudrna.
- Schedule interview with Jim Wack (extension 2337) regarding the reasons for data quality problems.

Detailed Notes: See attached transcript.

Joint Application Development (JAD)

- Joint user-analyst meeting hosted by a facilitator
  - 10 to 20 users
  - 1 to 2 scribes as needed to record the session
  - Usually in a specially prepared room
- Meetings can be held electronically and anonymously
  - Reduces problems in group settings
  - Can be held remotely
- Sessions require careful planning to be successful
  - Users may need to bring documents or user manuals
  - Ground rules should be established

Joint Application Development (JAD)

- Prepare questions as with interviews
- Formal agenda and ground rules
- Facilitator activities
  - Keep session on track
  - Help with technical terms and jargon
  - Record group input
  - Help resolve issues
- Post-session follow-up

JAD Case Study: SCYP

Project approach

- The project will collect high-level requirements in workshops with SCYP managers and practitioners. 4-5 workshops are planned to accommodate a range of stakeholders:
  - **Assistant Directors:** comprising senior operational managers who will understand the broader process and operational challenges;
  - **First-line managers:** comprising managers who are knowledgeable on overall case management, review, performance/KPI issues and reporting;
  - **Practitioners:** comprising counsellors and staff who have a detailed working view of day-to-day case management and associated processes and technology;
  - **Support officers:** comprising support officers and other nominated specialists who have a detailed, SCYP-wide view of the issues and challenges faced by SCYP users.
- The agenda for the workshops will vary slightly for each audience but will largely follow a similar agenda. Each workshop will involve 6-8 nominees from SCYP, as well as specialists from IT. The workshops will be run and documented by an external facilitator.

JAD Challenges

- Reducing domination
- Encouraging non-contributors
- Side discussions
- Agenda merry-go-round
- Violent agreement
- Unresolved conflict
- True conflict

Questionnaires

- A set of written questions used to obtain information from individuals
- May be paper based or electronic
- Generally used if there are large numbers of users, or if the analyst needs both information and opinions
- Also used when designing for a system that will have external users
- Typical response rates: < 50% (paper); < 30% (Web)

Questionnaires

- Select the participants
  - Identify the population
  - Use representative samples for large populations

- Designing the questionnaire
  - Careful question selection
  - Remove ambiguities

- Administering the questionnaire
  - Working to get good response rate
  - Offer an incentive

- Questionnaire follow-up
  - Send results to participants
  - Send a thank-you

Questionnaires

- Begin with non-threatening and interesting questions
- Group items into logically coherent sections
- No important items at the very end
- Do not crowd a page with too many items
- Avoid abbreviations
- Avoid biased or suggestive items or terms
- Number questions to avoid confusion
- Pretest to identify confusing questions
- Provide anonymity to respondents

Document Analysis

- Provides information about the “as-is” system
- Review technical documents when available
- Review typical user documents, such as forms and reports
- Look for user additions to forms
- Look for unused form elements

Observation

- Users/managers often don’t remember everything they do
- Checks validity of information gathered in other ways
- Behaviors may change when people are watched
  - Workers tend to be very careful when watched
  - Keep a low profile
  - Try not to interrupt or influence workers
- Be careful not to ignore periodic activities (Weekly/Monthly/Annually)

Comparing Requirements Gathering Techniques

	Interview	JAD	Questionnaires	Document Analysis	Observation
Type of information	As-is, to-be, improvements	As-is, to-be, improvements	As-is, improvements	As-is	As-is
Depth	High	High	Medium	Low	Low
Breadth	Low	Medium	High	High	Low
Integration	Low	High	Low	Low	Low
User involvement	Medium	High	Low	Low	Low
Cost	Medium	Low-medium	Low	Low	Low-medium

Other Techniques

- Concept Maps
  - Represent meaningful relationships between concepts
  - Focus individuals on a small number of key ideas

- User Stories & User Journeys
  - Associated with agile development methods
  - Low tech, high touch, easily updatable, and very portable
  - Captured using story cards (index cards)
  - Captures both functional and nonfunctional requirements.

Requirements Gathering Techniques – Case Study (Government)

User profiles:

This helps to first put a face to a role, which helps to build empathy and appreciate actually what these roles consist of. They highlight some of the pain points and general day to day experiences.

Requirements Gathering Techniques – Case Study (Government)

I am a caseworker…

I need to have access to all the evidence that exists to support the customers case so that I can make an informed decision.
- The documents they provide
- The background information
- Criminal record checks
- Biometric data

I have a very clear set of procedures that I need to follow to carry out my role, mapped out in the relevant minute sheet.

Pain Points
Before I receive the case it goes through several other touch points.
If these other teams have not done their roles correctly or to completion, I have to do it. Any small mistakes or missing data can have a knock on effect that could put our nation at risk.
I also have targets to meet each day, and if I have to take on extra work because I've been handed cases that aren't ready I can't keep to targets.

"Caseworkers role is to consider claim, not input data."

System Proposal

- Combines all material created in planning and analysis phases
- Included sections:
  - Executive summary
  - The system request
  - The work plan
  - The feasibility analysis
  - The requirements definition
  - Current models of the system

References

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