西安电子科技大学
XIDIAN UNIVERSITY

06 系统分析与设计
(System Analysis and Design)

Requirements Discovery

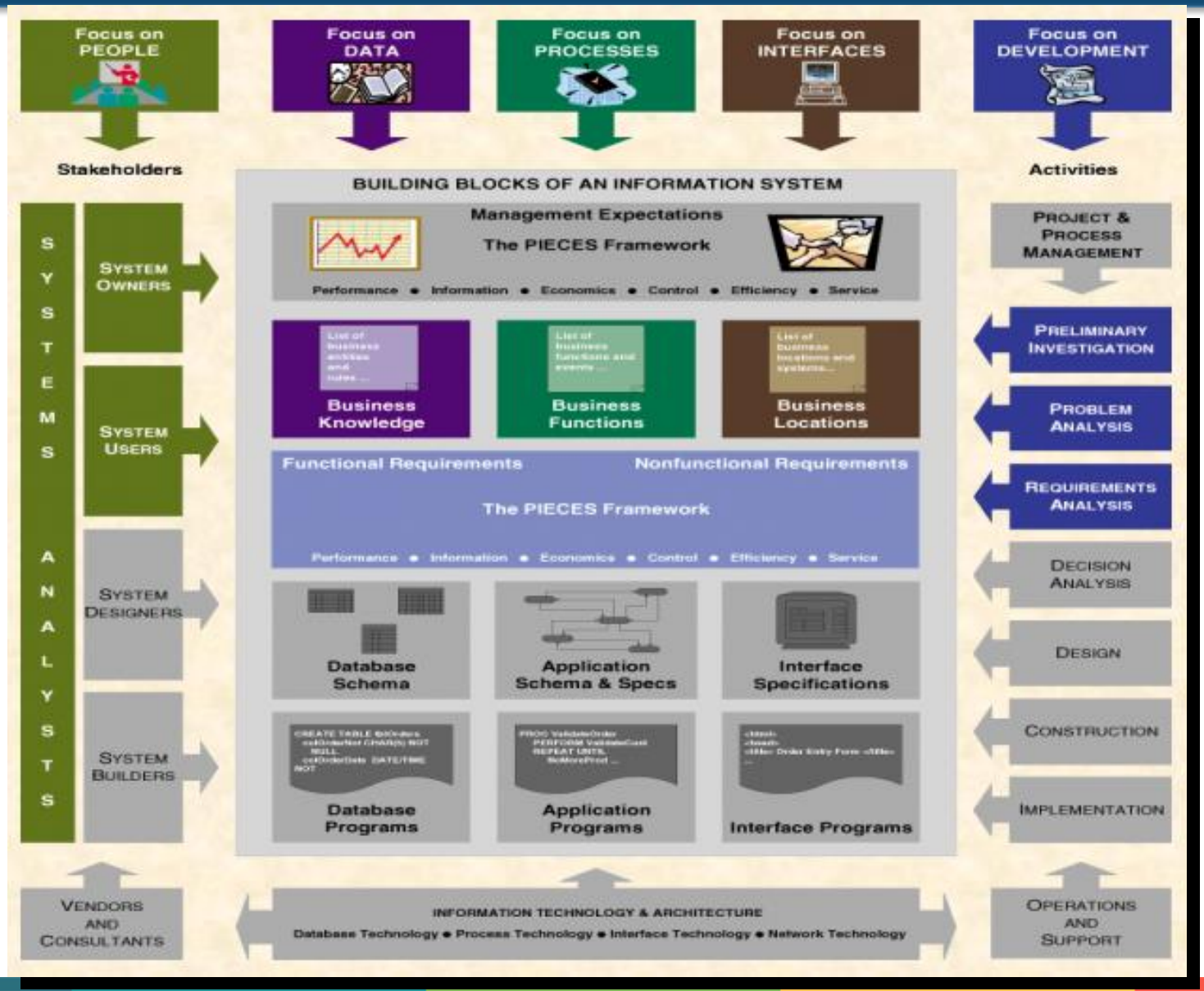
Content Structure

- The Story
  - 又召集了一个会议，对项目计划进行了修正，要求进一步提高需求分析的效率，讨论了相应的保障措施。
- An Introduction to Requirements Discovery
- The Process of Requirements Discovery
  - 发现和分析问题；发现需求；用文档书写需求并加以分析；需求的管理。
- Requirements Discovery Methods
  - 几种发现需求的常用方法。
- A Fact-Finding Strategy
- Documenting Requirements Methods
  - 几种用文档表示需求的方法。

Content Structure

- The Story
  - 又召集了一个会议，对项目计划进行了修正，要求进一步提高需求分析的效率，讨论了相应的保障措施。
- An Introduction to Requirements Discovery
- **The Process of Requirements Discovery**
  - 发现和分析问题；发现需求；用文档书写需求并加以分析；需求的管理。
- **Requirements Discovery Methods**
  - 几种发现需求的常用方法。
- **A Fact-Finding Strategy**
- Documenting Requirements Methods
  - 几种用文档表示需求的方法。

Chapter Map


Focus on PEOPLE
Focus on DATA
Focus on PROCESSES
Focus on INTERFACES
Focus on DEVELOPMENT
Stakeholders
Activities
BUILDING BLOCKS OF AN INFORMATION SYSTEM
Management Expectations
The PIECES Framework
Performance • Information • Economics • Control • Efficiency • Service
SYSTEMS ANALYSTS
System Owners
System Users
System Designers
System Builders
Business Knowledge
Business Functions
Business Locations
Functional Requirements
Nonfunctional Requirements
The PIECES Framework
Performance • Information • Economics • Control • Efficiency • Service
Database Schema
Application Schema & Specs
Interface Specifications
Database Programs
Application Programs
Interface Programs
Project & Process Management
Preliminary Investigation
Problem Analysis
Requirements Analysis
Decision Analysis
Design
Construction
Implementation
Vendors and Consultants
INFORMATION TECHNOLOGY & ARCHITECTURE
Database Technology • Process Technology • Interface Technology • Network Technology
Operations and Support

An Introduction to Requirements Discovery

Introduction to Requirements Discovery

- **Requirements Discovery 需求发现** includes those techniques to be used by systems analysts to identify or extract system problems and solution requirements from the user community.
- **Problem Analysis 问题分析** is the activity of identifying the problem, understanding the problem (including causes and effects), and understanding any constraints that may limit the solution.
- A **System Requirement 系统需求** (also called a business requirement) is a description of the needs and desires for an information system. A requirement may describe functions, features (attributes), and constraints.

Types of Requirements

- A **functional requirement 功能性需求** is a function（功能）or feature（特性） that must be included in an information system in order to satisfy the business need and be acceptable to the users.
- A **nonfunctional requirement 非功能需求** is a description of the features（特性）, characteristics（特征）, and attributes（属性） of the system as well as any constraints（约束） that may limit the boundaries of the proposed solution.

Functional Requirements

A functional requirement is an action of the system and usually is written using an action verb phrase.

- Examples:
  - Process a checking account deposit（处理一笔活期帐户存款）.
  - Calculate the GPA for a student（计算一个学生的平均成绩）.
  - Capture the account holder identification information（收集帐户持有者的身份识别信息）.

Nonfunctional Requirements

需求类型	解释
性能 Performance	性能需求表示为了满足用户的需求而要求系统展示的性能 · What is the acceptable throughput rate *（吞吐率）*? · What is the acceptable response time *（响应时间）*?
信息 Information	信息需求表示有关用户的信息，形式为内容、时效性、精确性和格式 · What are the necessary inputs and outputs? When must they happen? · What is the required data to be stored? · How current must the information be? · What are the interfaces to external systems?
经济 Economy	经济需求表示系统对减少开支或增加收益的需要 · What are the areas of the system where costs must be reduced? · How much should costs be reduced or profits be increased? · What are the budgetary limits? · What is the timetable for development?
控制 Control (and Security)	控制需求表示系统必须在其中运行的环境以及必须提供的安全类型和程度 · Must access to the system or information be controlled? · What are the privacy *（秘密程度）* requirements? · Does the criticality of the data necessitate the need for special handling (backups *（备份）*, offsite *（异地）* storage, etc.) of the data?

Nonfunctional Requirements

需求类型	解释
效率 Efficiency	效率需求标识系统以最低成本产生输出的能力 · Are there duplicate steps in the process that must be eliminated? · Are there ways to reduce waste in the way the system uses it resources?
服务 Service	服务需求表示使系统可靠、灵活和可扩充的需求 · Who will use the system and where are they located? · Will there be different types of users? · What are the appropriate human factors? · What training devices and training materials are to be included in the system? · What training devices and training materials are to be developed and maintained separately from the system, such as stand- alone computer based training (CBT) programs or databases? · What are the reliability/availability requirements? · How should the system be packaged and distributed? · What documentation is required?

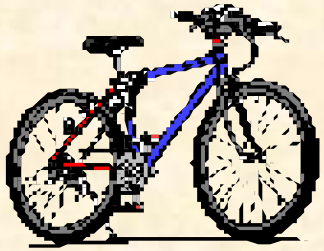
需求类型	需求内容
(a)	1. 有哪些不必要的重复步骤可以被消除？ 2. 系统能否采用新方法以降低使用资源的成本？
(b)	1. 系统可接受的吞吐率是多少？ 2. 系统可接受的响应时间是多少？
(c)	1. 应该减少多少开支或增加多少收益？ 2. 预算限度时多少？
(d)	1. 对用户隐私有什么要求？ 2. 重要的数据需要进行特殊的处理（备份或脱机存储）吗？
(e)	1. 有哪些类型的用户？分别在什么地方使用系统？ 2. 系统的可靠性和可用性有什么要求？ 3. 系统中需要包括哪些文档和培训材料？
(f)	1. 需要输入和输出什么内容？必须在什么时候发生？ 2. 对外部系统的接口是什么？

需求类型	需求内容
效益（Efficiency）	1. 有哪些不必要的重复步骤可以被消除？ 2. 系统能否采用新方法以降低使用资源的成本？
性能（Performance）	1. 系统可接受的吞吐率是多少？ 2. 系统可接受的响应时间是多少？
经济（Economics）	1. 应该减少多少开支或增加多少收益？ 2. 预算限度时多少？
控制（Control）	1. 对用户隐私有什么要求？ 2. 重要的数据需要进行特殊的处理（备份或脱机存储）吗？
服务（Service）	1. 有哪些类型的用户？分别在什么地方使用系统？ 2. 系统的可靠性和可用性有什么要求？ 3. 系统中需要包括哪些文档和培训材料？
信息（Information）	1. 需要输入和输出什么内容？必须在什么时候发生？ 2. 对外部系统的接口是什么？

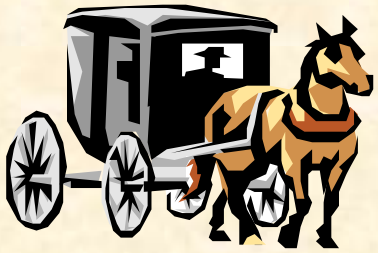
An Ambiguous Requirements Statement

- Requirement: Create a means to transport a single individual from home to place of work.
- Different interpretations from different system roles (they must cause different solutions):

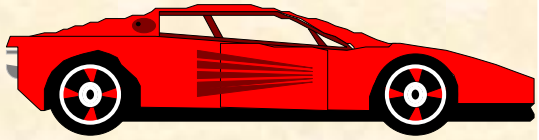
Management Interpretation



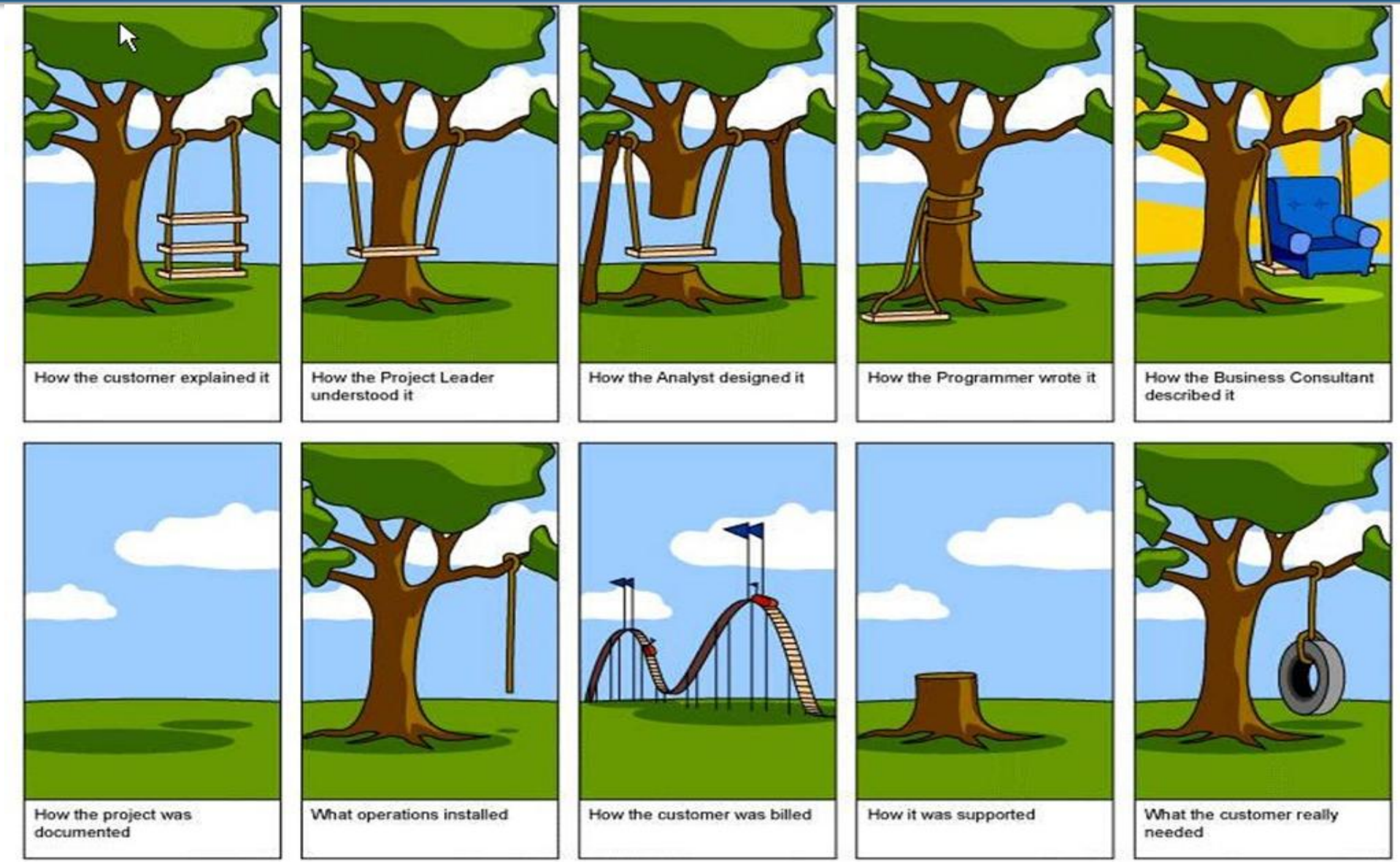
IT Interpretation



User Interpretation



An Ambiguous Requirements Statement



Results of Incorrect Requirements

- The system may cost more than projected.
- The system may be delivered later than promised.
- The system may not meet the users' expectations and that dissatisfaction may cause them not to use it.
- Once in production, the costs of maintaining and enhancing the system may be excessively high.
- The system may be unreliable and prone to errors and downtime.
- The reputation of the IT staff on the team is tarnished because any failure, regardless of who is at fault, will be perceived as a mistake by the team.

Relative Cost to Fix an Error

Phase in Which Found	Cost Ratio
Requirements	1
Design	3-6
Coding	10
Development Testing	15-40
Acceptance Testing	30-70
Operation	40-1000

Criteria to Define System Requirements

- Consistent（一致的） – the requirements are not conflicting or ambiguous.
- Complete（完整的） – the requirements describe all possible system inputs and response.
- Feasible（可行的） – the requirements can be satisfied based on the available resources and constraints.
- Required（所需的） – the requirements are truly needed and fulfill the purpose of the system.
- Accurate（准确的） – the requirements are stated correctly.
- Traceable（可追踪的） – the requirements directly map to the functions and features of the system.
- Verifiable（可验证的） – the requirements are defined so they can be demonstrated during testing.

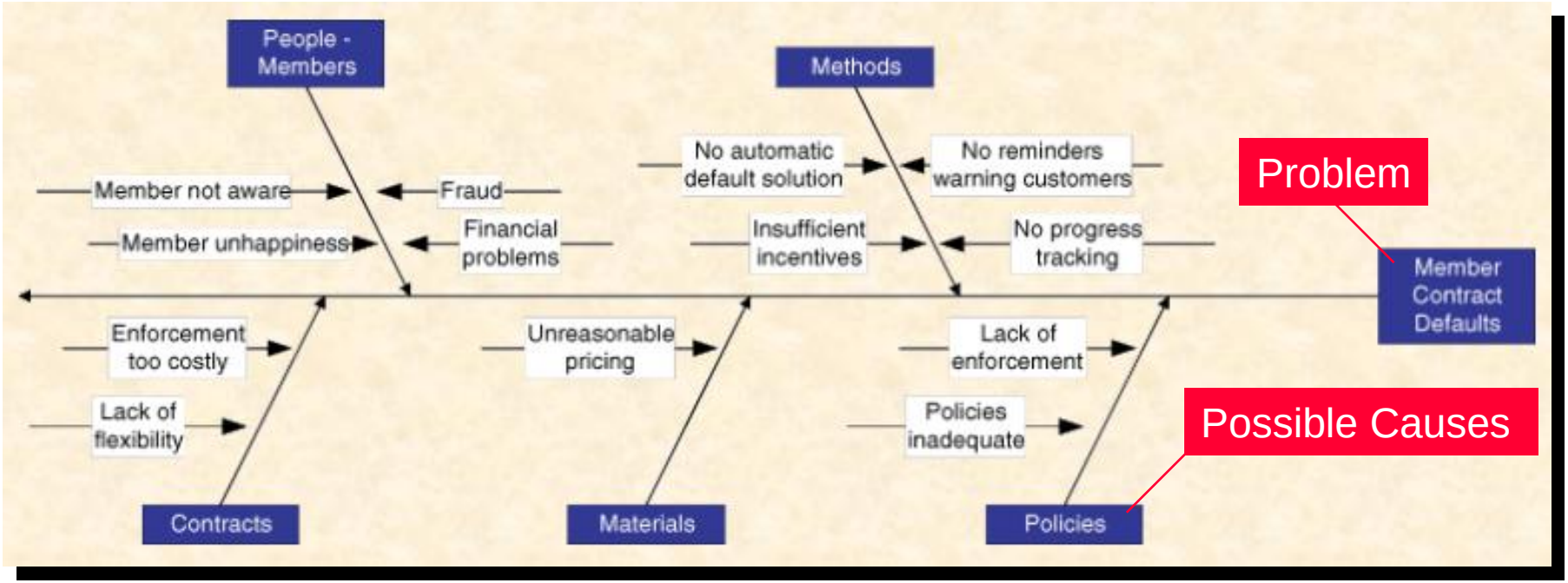
The Process of Requirements Discovery

The Process of Requirements Discovery

- Problem discovery and analysis
- Requirements discovery
- Documenting and analyzing requirements
- Requirements management

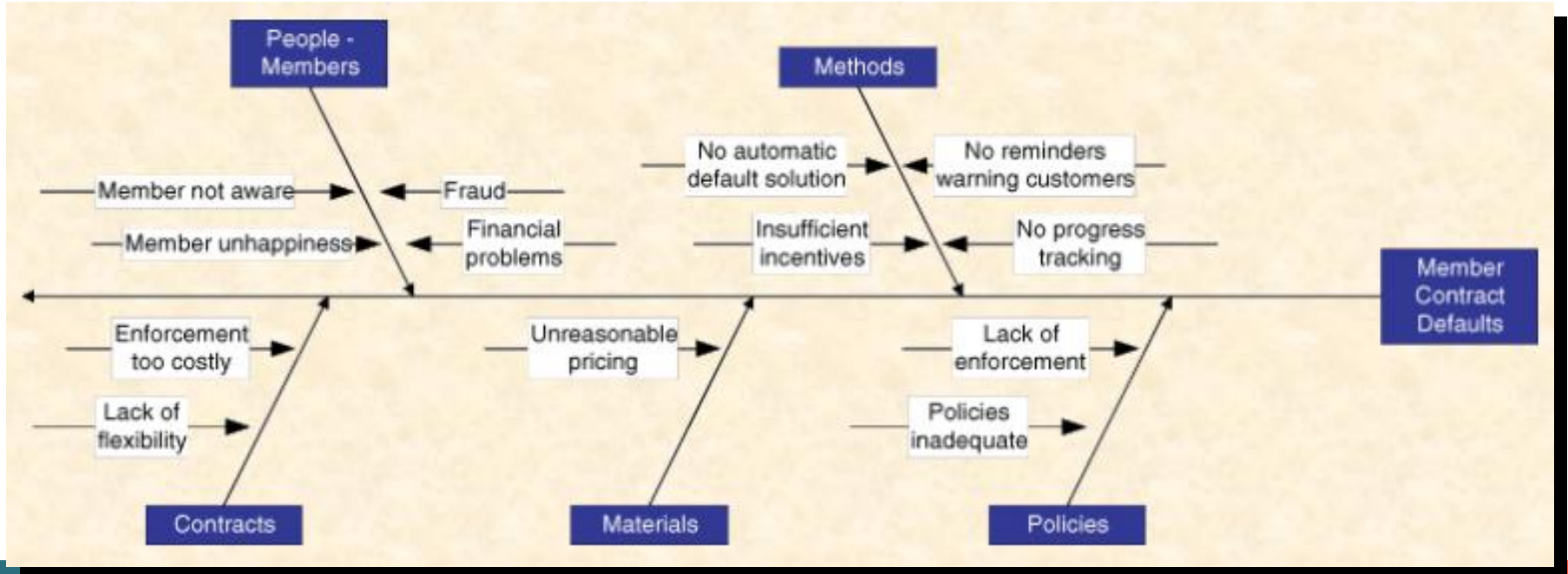
Problem discovery and analysis – Ishikawa Diagram

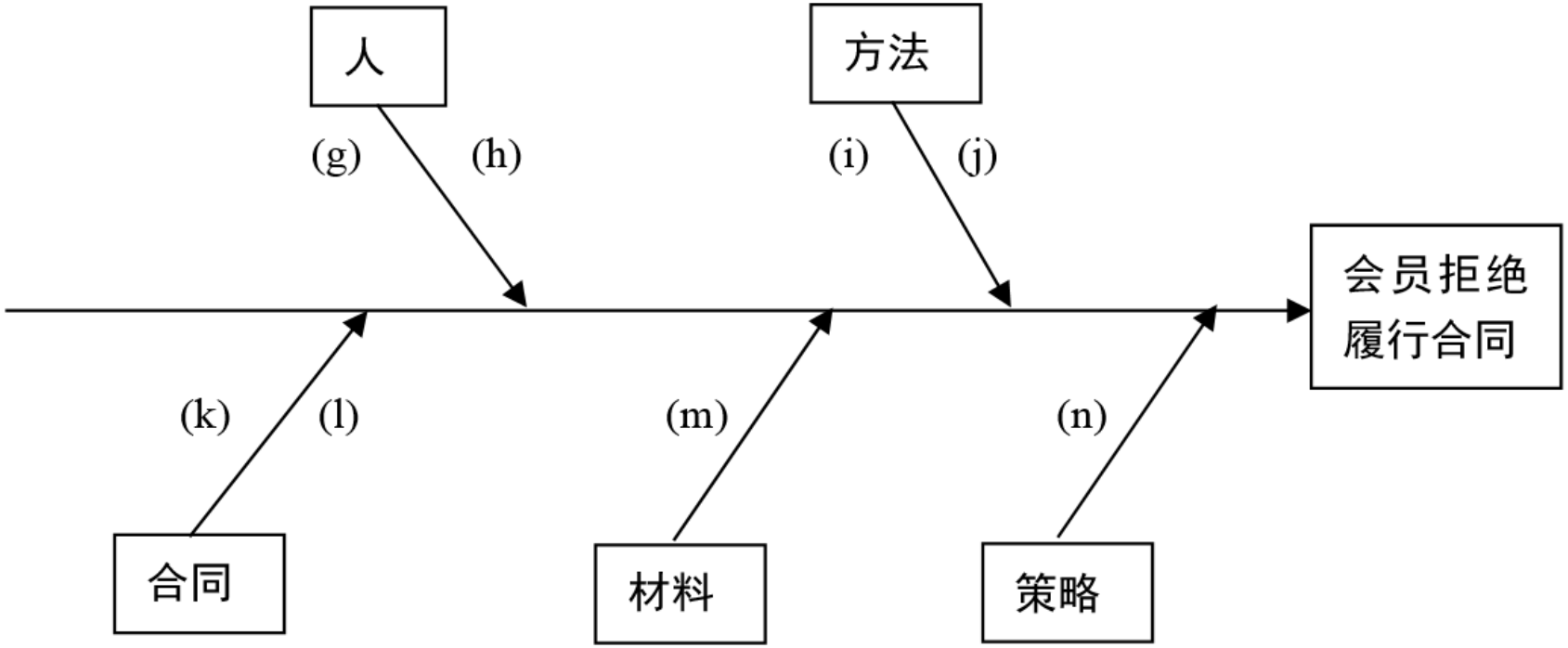
- The Ishikawa diagram is a graphical tool used to identify, explore, and depict problems and the causes and effects of those problems. It is often referred to as a cause-and-effect diagram or a fishbone diagram.



Problem discovery and analysis – Ishikawa Diagram

- Four basic categories for causes (4M): Materials, Machines, Manpower, and Methods.
- Additional categories for causes (4P): Places, Procedures, Policies, and People, or (4S): Surroundings, Suppliers, Systems, and Skills.

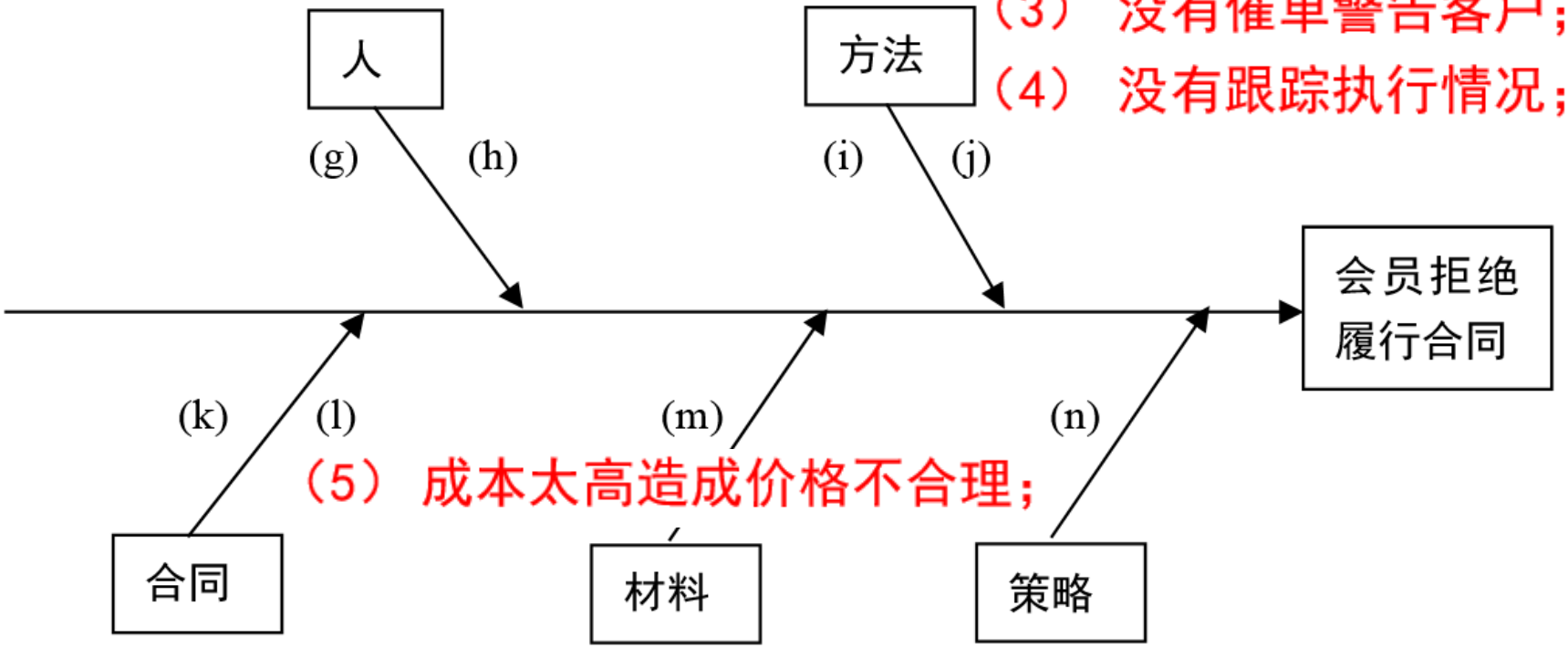




（1） 缺少强制履行合同的措施；
（2） 会员没有得到合同的通知；
（3） 没有催单警告客户；
（4） 没有跟踪执行情况；
（5） 成本太高造成价格不合理；
（6） 合同的履行缺乏灵活性；
（7） 财务问题或者隐瞒相关内容；
（8） 价格太高并且无法修改。

（2） 会员没有得到合同的通知；

（7） 财务问题或者隐瞒相关内容；



（3） 没有催单警告客户；

（4） 没有跟踪执行情况；

（5） 成本太高造成价格不合理；

（6） 合同的履行缺乏灵活性；

（1） 缺少强制履行合同的措施；

（8） 价格太高并且无法修改。

Requirements Discovery

- Fact-finding is the formal process of using research, interviews, questionnaires, sampling, and other techniques to collect information about problems, requirements, and preferences（偏好）. It is also called information gathering.
- Seven Fact-Finding Methods：
  - Sampling of existing documentation, forms, and databases.
  - Research and site visits.
  - Observation of the work environment.
  - Questionnaires.
  - Interviews.
  - Prototyping.
  - Joint requirements planning (JRP).

Documenting and Analyzing Requirements

A requirements definition document should consist of the following.

- The functions and services the system should provide.
- Nonfunctional requirements including the system's features, characteristics, and attributes.
- The constraints that restrict the development of the system or under which the system must operate.
- Information about other systems the system must interface with.

Sample requirements definition outline

Requirements Definition Report

1. Introduction
    - 1.1 Purpose
    - 1.2 Background
    - 1.3 Scope
    - 1.4 Definitions, Acronyms, and Abbreviations
    - 1.5 References
2. General Project Description
    - 2.1 System Objectives
3. Requirements and Constraints
    - 3.1 Functional Requirements
    - 3.2 Nonfunctional Requirements
4. Conclusion
    - 4.1 Outstanding Issues

Appendix (optional)

Validating Requirements

- **Requirements Validation 需求验证** is an activity that checks the requirements definition document for accuracy, completeness, consistency, and conformance to standards.
- Examples of errors the system analyst might find are:
  - System models that contain errors（系统建模出错）.
  - Typographical or grammar errors（印刷或语法出错）.
  - Requirements that conflict with each other（需求有矛盾）.
  - Ambiguous or poorly worded requirements（需求表达得模糊或用词不当）.
  - Lack of conformance to quality standards required for the document（缺乏对文档质量标准的顺应性）.

Requirements Management

- **Requirements Management 需求管理** is the process of managing change to the requirements.

Requirements Discovery Methods

Seven Fact-Finding Methods

- Sampling of existing documentation, forms, and databases.
- Research and site visits.
- Observation of the work environment.
- Questionnaires.
- Interviews.
- Prototyping.
- Joint requirements planning (JRP).

Seven Fact-Finding Methods

- Sampling of existing documentation, forms, and databases.
- Research and site visits（自己看）.
- Observation of the work environment.
- Questionnaires.
- Interviews.
- Prototyping（自己看）.
- Joint requirements planning (JRP).

Collecting Facts from Existing Documentation

- Get the organization chart.
- Trace the history that led to the project from:
  - Interoffice memoranda（便笺）, studies, minutes（备忘录）, suggestion box notes, customer complaints, and reports that document the problem area.
  - Accounting records（帐务往来记录）, performance reviews（性能评审结果）, work measurement reviews（工作测量评审结果）, and other scheduled operating reports.
  - Information systems project requests – past and present.

Collecting Facts from Existing Documentation

- Get the documents describing the business functions:
  - The company's mission statement and strategic plan.
  - Formal objectives for the organization subunits being studied.
  - Policy manuals that may place constraints on any proposed system.
  - Standard operating procedures (SOPs), job outlines, or task instructions for specific day-to-day operations.
  - Completed forms that represent actual transactions at various points in the processing cycle.
  - Samples of manual and computerized database.
  - Samples of manual and computerized screens and reports.

Collecting Facts from Existing Documentation

- Get the documents of previous system studies and designs:
  - Various types of flowchart and diagrams.
  - Project dictionaries or repositories.
  - Design documentation, such as inputs, outputs, and databases.
  - Program documentation.
  - Computer operations manuals and training manuals.

Document and File Sampling Techniques

- Sampling is the process of collecting a representative sample of documents, forms, and records.
  - Determining the sample size:
  - Sample Size = 0.25 x (Certainty factor / Acceptable error)2
  - For a 90% certainty（信度）:
  - Sample Size = 0.25(1.645/0.10)2 = 68

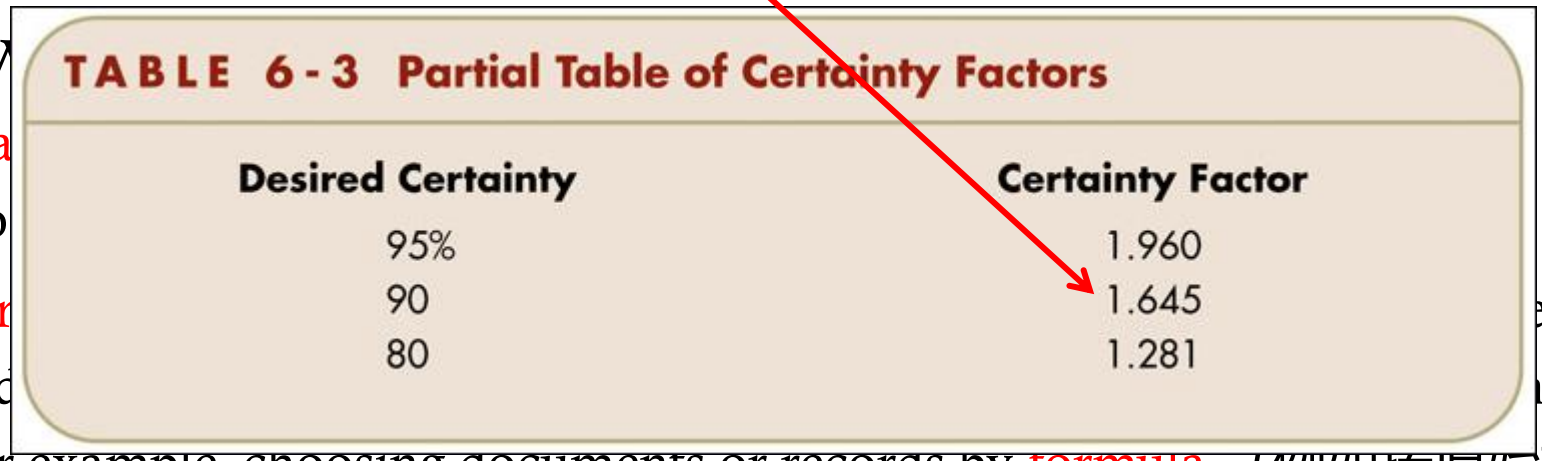


TABLE 6-3 Partial Table of Certainty Factors

Desired Certainty	Certainty Factor
95%	1.960
90	1.645
80	1.281

- How
  - Ra having no
  - Str empts to rec pling—for example, choosing documents or records by formula（例如按原始材料的顺序、以固定的间隔来选取）—and by avoiding very high or low estimates.

Observation of The Work Environment

- Observation is a fact-finding technique wherein the systems analyst either participates in or watches a person perform activities to learn about the system.
  - Advantages（自己看）
  - Disadvantages（自己看）
- Work sampling is a fact-finding technique that involves a large number of observations taken at random intervals.
- Living the System is one of the most effective ways to learn about problems and requirements of the system (the system analyst actively performs the role of the user for a short time).
- 演员要演好戏，必须要深入生活、体验生活。

Observation Guidelines

- Determine the who, what, where, when, why, and how of the observation（学习记者的作风：确定六要素）.
- Obtain permission from appropriate supervisors or managers（允许后再进入，尊重现场的领导人）.
- Inform those who will be observed of the purpose of the observation（提前预约，不要搞突然袭击）.
- Keep a low profile（保持低调）.
- Take notes during or immediately following the observation（及时记录观察的结果，避免以后凭想象来归纳）.
- Review observation notes with appropriate individuals（核实也是在作进一步的观察）.
- Don‘t interrupt the individuals at work（要有“眼色”，不要讨人嫌）.
- Don‘t focus heavily on trivial activities（抓住关键）.
- Don‘t make assumptions（不要先入为主）.

Questionnaires

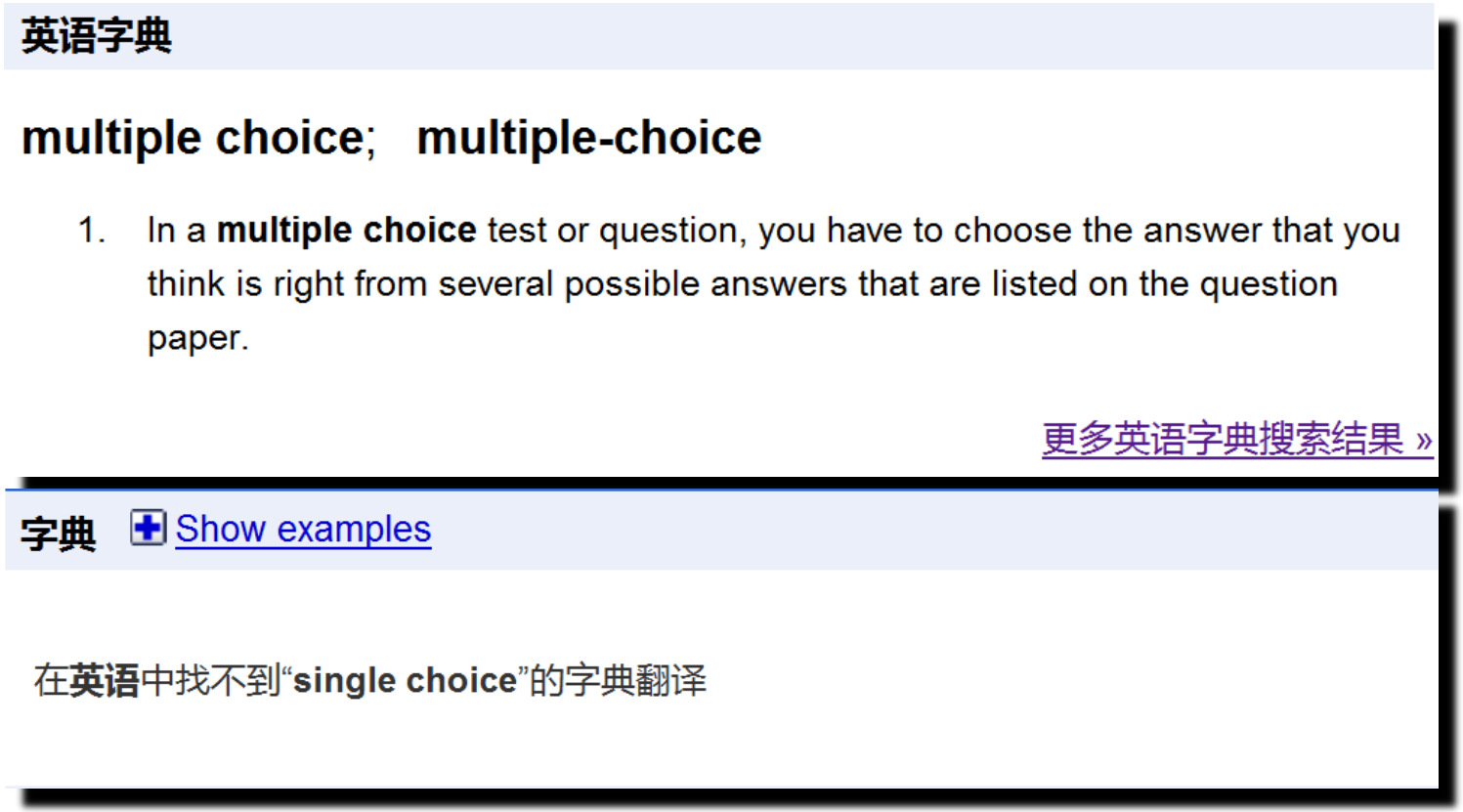
- Questionnaires are special-purpose documents that allow the analyst to collect information and opinions from respondents.
  - Advantages（自己看）
  - Disadvantages（自己看）

Types of Questionnaires

- Free-format questionnaires offer the respondent greater latitude in the answer. A question is asked, and the respondent records the answer in the space provided after the question.
  - An example:
    - What reports do you currently receive and how are they used?
    - Are there any problems with these reports (e.g., are they inaccurate, is there insufficient information, or are they difficult to read and/or use)? If so, please explain.
- Fixed-format questionnaires contain questions that require selection of predefined responses from individuals.

Types of Fixed-Format Questions

- Multiple-choice questions
- Rating questions
- Ranking questions



英语字典

multiple choice; multiple-choice

1. In a **multiple choice** test or question, you have to choose the answer that you think is right from several possible answers that are listed on the question paper.

更多英语字典搜索结果 »

字典 Show examples

在**英语**中找不到"**single choice**"的字典翻译

Questionnaire Procedure

- Determine what facts and opinions must be collected and from whom you should get them.
- Based on the needed facts and opinions, determine whether free- or fixed-format questions will produce the best answers.
- Write the questions.
- Test the questions on a small sample of respondents.
- Duplicate and distribute the questionnaire.

Interviews

- Interviews（面谈） are a fact-finding technique whereby the systems analysts collect information from individuals through face-to-face interaction.
  - Advantages（自己看）
  - Disadvantages（自己看）

Shaking hands with others

- 事半功倍
- 身正不会影子斜
- 张弛有度
- 眉目传情
- 三上四下
- 没有不散的宴席

Hugging with others

- 事半功倍
- 右高左低
- 距离产生美
- 张弛有度
- 肌肤相亲
- 没有不散的宴席

Types of Interviews

- Unstructured interviews are conducted with only a general goal or subject in mind and with few, if any, specific questions. The interviewer counts on the interviewee to provide a framework and direct the conversation.
- In structured interviews the interviewer has a specific set of questions to ask of the interviewee.

Types of Interview Questions

- Open-ended questions allow the interviewee to respond in any way that seems appropriate.
- Closed-ended questions restrict answers to either specific choices or short, direct responses.

Procedure to Conduct an Interview

- Select Interviewees.
- Prepare for the Interview.
  - An interview guide is a checklist of specific questions the interviewer will ask the interviewee.
- Conduct the Interview.
- Follow Up on the Interview（落实和确认面谈的结果）.

Prepare for the Interview – Types of Questions to Avoid

- Loaded questions（含沙射影的问题）
  - "Do we have to have both of these columns on the report?"
  - 逼着被访者谈出个人看法，来评价原来的系统。
- Leading questions（居高临下的问题）
  - "You're not going to use this OPERATOR CODE, are you?"
  - 为被访者先设计出有倾向性的响应。
- Biased questions（有偏向的问题）
  - "How many codes do we need for FOOD CLASSIFICATION in the INVENTORY FILE? I think 20 ought to cover it."
  - 不等被访者回答就表露出你的看法。

Prepare for the Interview – Interview Question Guidelines

- Use clear and concise（简明的） language.
- Don't include your opinion as part of the question.
- Avoid long or complex questions.
- Avoid threatening（胁迫性的） questions.
- Don't use "you" when you mean a group of people.

Sample Interview Guide (P.233)

Conduct the Interview – Interviewing Do's and Don'ts

Do

- Be courteous（有礼貌）
- Listen carefully
- Maintain control
- Probe（深入探讨）
- Observe mannerisms and nonverbal communication（观察对方的习惯和非语言交流方式）
- Be patient（有耐心）
- Keep interviewee at ease
- Maintain self-control（有自制力）

Avoid

- Continuing an interview unnecessarily.
- Assuming an answer is finished or leading nowhere.
- Revealing（显露出） verbal（口头的） and nonverbal clues（线索）.
- Using jargon（使用 IT 术语）.
- Revealing your personal biases.
- Talking instead of listening.
- Assuming anything about the topic and the interviewee.
- Tape recording -- a sign of poor listening skills.

Communicating With the User

- Listening - "To hear is to recognize that someone is speaking, to listen is to understand what the speaker wants to communicate." (Gildersleeve – 1978)
- Guidelines for Communicating
  - Approach the session with a positive attitude.
  - Set the other person at ease.
  - Let them know you are listening.
  - Ask questions.
  - Don't assume anything.
  - Take notes.

Body Language and Proxemics

- Body language（形体语言） is all of the nonverbal information being communicated by an individual. Body language is a form of nonverbal communications that we all use and are usually unaware of.
- Proxemics（空间关系学） is the relationship between people and the space around them. Proxemics is a factor in communications that can be controlled by the knowledgeable analyst.

Spatial Zones

- Intimate zone（亲密区）– closer than 1.5 feet (< 0.38m)
- Personal zone（个人区）– from 1.5 feet to 4 feet (0.38m ~ 1m)
- Social zone（社交区） – from 4 feet to 12 feet (1m ~ 3m)
- Public zone（公众区） – beyond 12 feet (> 3m)

Joint Requirements Planning

- Joint requirements planning (JRP) is a process whereby highly structured group meetings are conducted for the purpose of analyzing problems and defining requirements. JRP is a subset of a more comprehensive joint application development or JAD (Joint Application Development) technique that encompasses the entire systems development process.

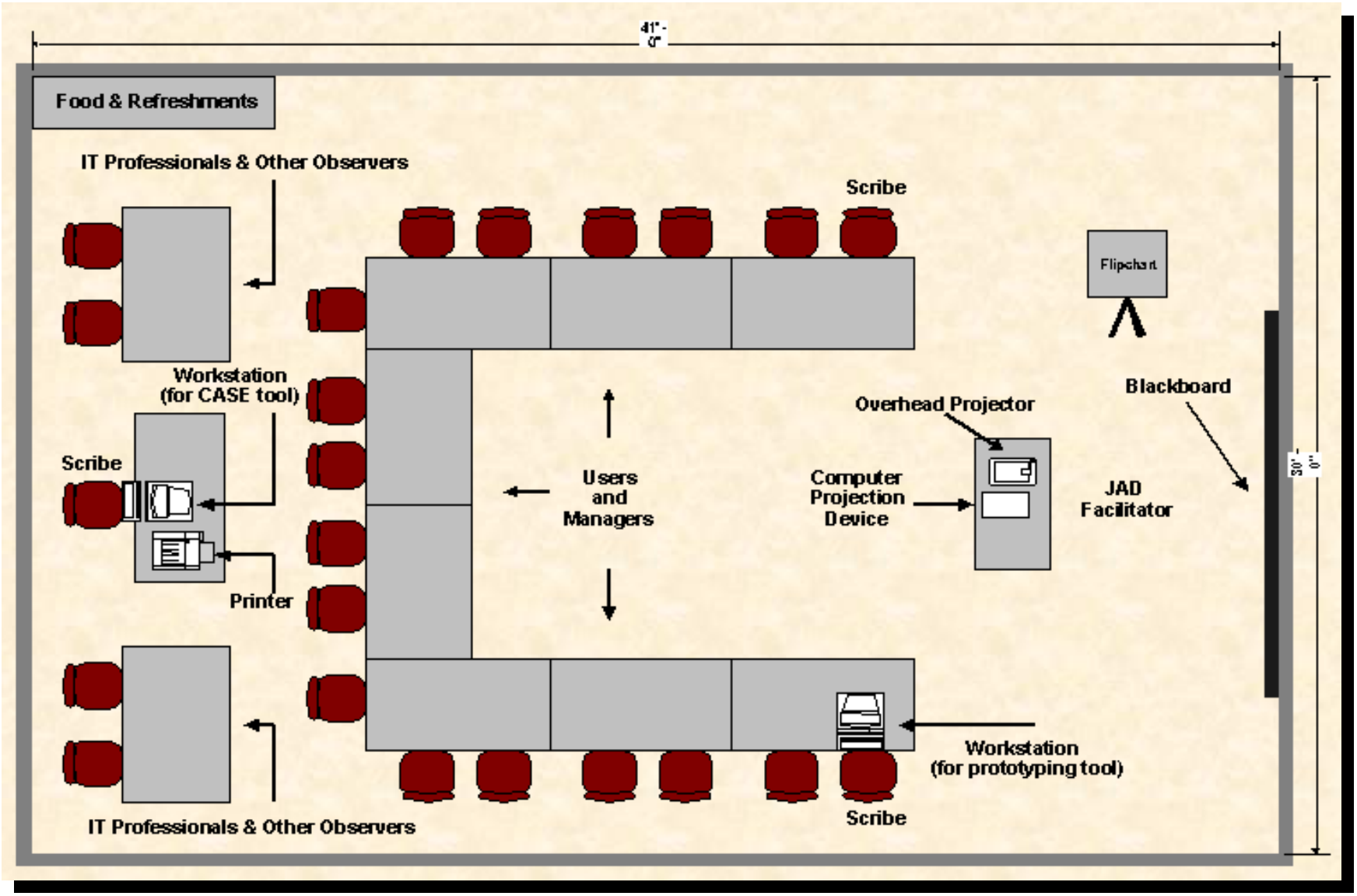
JRP Participants

- Sponsor
- Facilitator（主持人）
- Users and Managers
- Scribes（记录员）
- I.T. Staff

Steps to Plan a JRP Session

- Selecting a location
- Selecting the participants
- Preparing the agenda（议程）

Typical Room Layout for JRP Session



Guidelines for Conducting a JRP Session

- Do not unreasonably deviate（偏离） from the agenda.
- Stay on schedule.
- Ensure that the scribe is able to take notes.
- Avoid the use of technical jargon.
- Apply conflict resolution skills.（应用解决冲突的技能）
- Allow for ample（充分的） breaks.
- Encourage group consensus（鼓励团队取得一致意见）.
- Encourage user and management participation without allowing individuals to dominate the session.
- Make sure that attendees abide（遵守） by the established ground rules（基本规则） for the session.

Brainstorming

- Brainstorming（集体讨论 / 开诸葛亮会） is a technique for generating ideas during group meetings. Participants are encouraged to generate as many ideas as possible in a short period of time without any analysis until all the ideas have been exhausted.

Brainstorming Guidelines

- Isolate the appropriate people in a place that will be free from distractions（分心） and interruptions.
- Make sure that everyone understands the purpose of the meeting.
- Appoint one person to record ideas.
- Remind everyone of the brainstorming rules.
- Within a specified time period, team members call out their ideas as quickly as they can think of them.
- After the group has run out of ideas and all ideas have been recorded, then and only then should the ideas be analyzed and evaluated.
- Refine, combine, and improve the ideas that were generated earlier.

Benefits of JRP

- JRP actively involves users and management in the development project (encouraging them to take "ownership" in the project).
- JRP reduces the amount of time required to develop systems.
- When JRP incorporates prototyping as a means for confirming requirements and obtaining design approvals, the benefits of prototyping are realized.

A Fact-Finding Strategy

A Fact-Finding Strategy

- Learn all you can from existing documents, forms, reports, and files.
- If appropriate, observe the system in action.
- Given all the facts that you've already collected, design and distribute questionnaires to clear up things you don't fully understand.
- Conduct your interviews (or group work sessions).
- (Optional). Build discovery prototypes for any functional requirements that are not understood or if requirements need to be validated.
- Follow up.

Documenting Requirements Methods

Documenting Requirements Using Use Cases

- A use case（用例） is a behaviorally related sequence of steps (a scenario（剧情）), both automated and manual for the purpose of completing a single business task.
- An actor（参与者） represents anything that needs to interact with the system to exchange information. An actor is a user, a role, which could be an external system as well as a person.
- A temporal event（时序事件） is a system event that is triggered by time.

Benefits of Using Use Cases

- Facilitates user involvement.（便于用户的参与）
- A view of the desired system's functionality from an external person's viewpoint.（给出了从系统外所看到的系统功能视图）
- An effective tool for validating requirements.（有效地确认需求）
- An effective communication tool.（有效地交流）

Example of a High-Level Use Case

Author: S. Shepard

Date: 03/01/2000

Use Case Name:	New Member Order
Actors:	Member
Description:	This use case describes the process of a member submitting an order for SoundStage products. On completion, the member will be sent a notification that the order was accepted.

Example of a High-Level Use Case

Author: S. Shepard Date: 10/05/2000

Use Case Name:	Submit New Member Order	
Actor(s):	Member	
Description:	This use case describes the process of a member submitting an order for SoundStage products. On completion, the member will be sent a notification that the order was accepted.	
References	MSS-1.0 (1)	
Typical Course of Events: (2)	**Actor Action**	**System response**
	Step 1: This use case is initiated when a member submits an order to be processed	**Step 2**: The member's personal information such as address is validated against what is currently recorded in member services. **Step 3**: The member's credit status is checked with Accounts Receivable to make sure no payments are outstanding. **Step 4**: For each product being ordered, validate the product number and then check the availability in inventory and record the ordered product information. **Step 5**: Create a picking ticket for the member order containing all ordered products that are available and route it to the warehouse for processing. **Step 6**: Generate an order confirmation notice indicating the status of the order and send it to the member.
	Step 7: This use case concludes when the member receives the order confirmation notice.	

Example of a High-Level Use Case

Alternate Courses: 3	**Step 2**: If the club member has indicated an address or telephone number change on the promotion order, update the club member's record with the new information. **Step 3**: If Accounts Receivable returns a credit status that the customer is in arrears, send an order rejection notice to the member. **Step 4**: If the product number is not valid, send a notification to the member requesting them to submit a valid product number. If the product being ordered is not available, record the ordered product information and mark as "back-ordered."
Pre-condition: 4	Orders can only be submitted by members.
Post-condition: 5	Member order has been recorded and the picking ticket has been routed to the warehouse.
Assumptions: 6	None at this time.

Decision Tables

- A decision table is a tabular form of presentation that specifies a set of conditions and their corresponding actions (see Chapter 8).

Requirements Tables

- **Requirements Traceability**（需求可追踪性） is the ability to trace a system function or feature back to the requirement that mandates it.

An Example of a Requirements Table Format

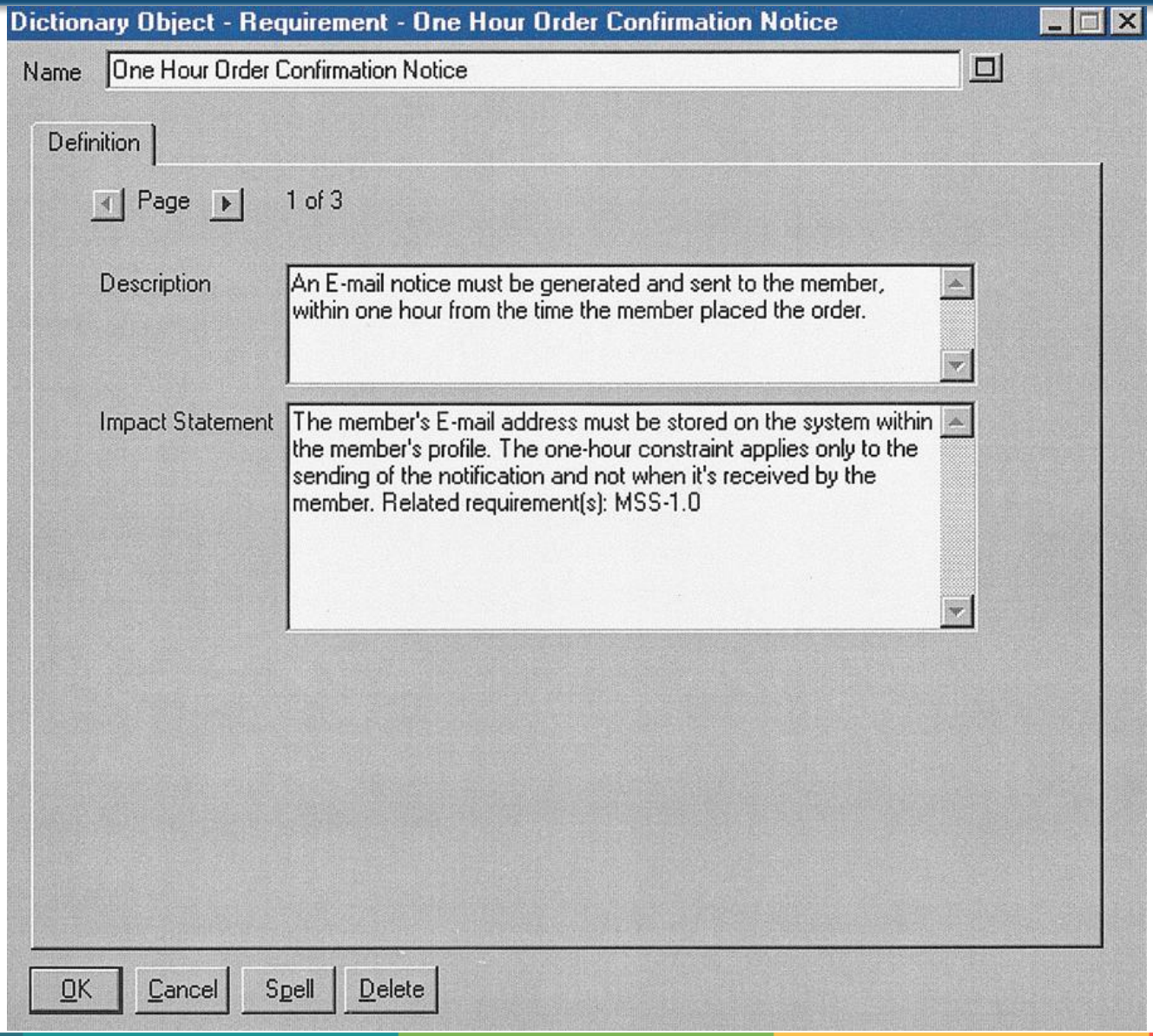
Requirement	Explanation
Requirement number	Indicate a unique number or identifier of the requiremen
Requirement title:	Assign short phrase indicating nature of the requiremen :
Requirement text:	Provide a textual statement of the requiremer t
Requirement type:	Indicate the requirement type
Requirement details and constraints	Functional characteristics or dimension
Rev date and rev #	Indicate the acceptance date and revision number of current (accepted/baselined) version
Criticality	Must, Want, or Optional

Partial List of Member Services System Requirements

Requirement	Explanation
Requirement number:	MSS-1.0
Requirement title:	Process New Member Order
Requirement text:	The system should be able to process new member orders. Within this process it should be able to validate member demographic information, verify credit worthiness, inquire and modify inventory levels based on quantity of product ordered, initiate backorder process in the event of insufficient inventory to fulfill order, and send an order confirmation notice once the order has been placed.
Requirement type:	Functional
Requirement details and constraints	Member credit status will be obtained from the Account Receivable system. A picking ticket, containing the available ordered items, must be generated and routed to the warehouse.
Rev date and rev#:	Version 1.0
Criticality	Must

Requirement	Explanation
Requirement number:	MSS-- 14.0
Requirement title:	One Hour Order Confirmation Notice
Requirement text:	An E-mail notice must be generated and sent to the member, within one hour from the time the member placed the order.
Requirement type:	Performance
Requirement details and constraints	The member's E-mail address must be stored on the system within the member's profile. The one- hour constraint applies only to the sending of the notification And not when it's received by the member. Related requirement(s): MSS- ..0
Rev date and rev #:	Version 1.0
Criticality	Must

System architect requirement example



要点与引申

- 问题发现得越早，越容易解决。
- 需求是需要去发现的，是需要采用合适的手段去发现的。
- 到目前为止，需求的发现主要还是靠系统分析员与相关人员的交流，以及亲临现场的体验。因此，系统分析员需要掌握交流的技能和工具，需要全身心的投入。