Fact-Finding Techniques for Requirements Discovery

Based on Chapter 6 of Whitten, Bentley, and Dittman:

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Introduction to Requirements Discovery

Requirements discovery – the process and techniques used by systems analysts to identify or extract system problems and solution requirements from the user community.

System requirement – something that the information system must do or a property that it must have. Also called a business requirement.
Functional vs. Nonfunctional Requirements

**Functional requirement** - something the information system must do

**Nonfunctional requirement** - a property or quality the system must have

- Performance
- Security
- Costs
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 they may not use it.
- Once in production, costs of maintaining and enhancing system may be excessively high.
- The system may be unreliable and prone to errors and downtime.
- Reputation of IT staff is tarnished as failure will be perceived as a mistake by the team.
Criteria for System Requirements

- **Consistent** – not conflicting or ambiguous.
- **Complete** – describe all possible system inputs and responses.
- **Feasible** – can be satisfied based on the available resources and constraints.
- **Required** – truly needed and fulfill the purpose of the system.
- **Accurate** – stated correctly.
- **Traceable** – directly map to functions and features of system.
- **Verifiable** – defined so can be demonstrated during testing.
Process of Requirements Discovery

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

- Identify the “true” problems to be solved by utilizing a new IS.
  - **Common mistake**: Identify a symptom as a problem.
- Ishikawa (Fishbone) Diagram:
  - A popular tool for identifying, analyzing, and solving problems.
Ishikawa (Fishbone) Diagram

- 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 at right (fish head)
- Possible causes drawn as "bones" off main backbone
- Brainstorm for 3-6 main categories of possible causes
Requirements Discovery

Given an **understand of problems**, the systems analyst can start to define requirements.

**Fact-finding** – the formal process of using research, meetings, interviews, questionnaires, sampling, and other techniques to collect information about system problems, requirements, and preferences. It is also called *information gathering* or *data collection*. 
Documenting and Analyzing Requirements

- Documenting the draft requirements
  - Use cases
  - Decision tables
  - Requirements tables
- Analyzing requirements to resolve problems
  - Missing requirements
  - Conflicting requirements
  - Infeasible requirements
  - Overlapping requirements
  - Ambiguous requirements
- Formalizing requirements
  - Requirements definition document
  - Communicated to stakeholders or steering body
Requirements Definition Document

Requirements Definition Document – A formal document that communicates the requirements of a proposed system to key stakeholders and serves as a contract for the systems project.

- Synonyms
  - Requirements definition report
  - Requirements statement
  - Requirements specification
  - Functional specifications
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. Functional Requirements
3. Requirements and Constraints
   3.1. Functional Requirements
   3.2. Nonfunctional Requirements
4. Conclusion
   4.1. Outstanding Issues
Appendix (optional)
Requirements Management

Requirements management - the process of managing change to the requirements.

- Over the lifetime of the project it is very common for new requirements to emerge and existing requirements to change.
- Studies have shown that over the life of a project as much as 50 percent or more of the requirements will change before the system is put into production.
Fact-Finding Ethics

Fact-Finding often brings systems analysts into contact with **sensitive information**, such as:
- Employee salaries or medical history
- Customer credit card or other information

**Ethical behavior**
- Systems analysts must not misuse information.
- Systems analysts must protect information from people who would misuse it.

**Otherwise**
- Systems analyst loses respect, credibility, and confidence of users and management.
- Organization and systems analyst could have legal liability
- Systems analyst could lose job
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).
Sampling Existing Documentation, Forms, & Files

**Sampling** – process of collecting a representative sample of documents, forms, and records.

- Organization chart
- Memos and other documents that describe the problem
- Standard operating procedures for current system
- Completed forms
- Manual and computerized screens and reports
- Samples of databases
- Flowcharts and other system documentation
- And more
Things to be Gleaned from Documents

- Symptoms and causes of problems
- Persons in organization who have understanding of problem
- Business functions that support the present system
- Type of data to be collected and reported by the system
- Questions that need to be covered in interviews
Why to Sample Completed Rather than Blank Forms

- Can determine type of data going into each blank
- Can determine size of data going into each blank
- Can determine which blanks are not used or not always used
- Can see data relationships
On-Site Observation

Observation – a fact-finding technique wherein the systems analyst either participates in or watches a person perform activities to learn about the system.

Advantages?
Disadvantages?

Work sampling - a fact-finding technique that involves a large number of observations taken at random intervals.
Observation Guidelines

- Determine the who, what, where, when, why, and how of the observation.
- Obtain permission from appropriate supervisors.
- Inform those who will be observed of the purpose of the observation.
- Keep a low profile.
- Take notes.
- Review observation notes with appropriate individuals.
- Don't interrupt the individuals at work.
- Don't focus heavily on trivial activities.
- Don't make assumptions.
Questionnaires

**Questionnaire** – a special-purpose document that allows the analyst to collect information and opinions from respondents.

**Free-format questionnaire** – a questionnaire designed to 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.

**Fixed-format questionnaire** – a questionnaire containing questions that require selecting an answer from predefined available responses.
Types of Fixed-Format Questions

- Multiple-choice questions
- Rating questions
- Ranking questions

Rank the following transactions according to the amount of time you spend processing them.

___ % new customer orders
___ % order cancellations
___ % order modifications
___ % payments

The implementation of quality discounts would cause an increase in customer orders.

___ Strongly agree
___ Agree
___ No opinion
___ Disagree
___ Strongly disagree

Is the current accounts receivable report that you receive useful?

___ Yes
___ No
Developing a Questionnaire

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

**Interview** - a fact-finding technique whereby the systems analysts collect information from individuals through face-to-face interaction.

- Find facts
- Verify facts
- Clarify facts
- Generate enthusiasm
- Get the end-user involved
- Identify requirements
- Solicit ideas and opinions

The personal interview is generally recognized as the most important and most often used fact-finding technique.
Types of Interviews and Questions

Unstructured interview – 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.

Structured interview – interviewer has a specific set of questions to ask of the interviewee.

Open-ended question – question that allows the interviewee to respond in any way.

Closed-ended question – a question that restricts answers to either specific choices or short, direct responses.
Procedure to Conduct an Interview

1. Select Interviewees
   - End users
   - Learn about individual prior to the interview

2. Prepare for the Interview
   - interview guide

3. Conduct the Interview
   - Summarize the problem
   - Offer an incentive for participation
   - Ask the interviewee for assistance

4. Follow Up on the Interview
   - Memo that summarizes the interview
Prepare for the Interview

- Types of Questions to Avoid
  - Loaded questions
  - Leading questions
  - Biased questions

- Interview Question Guidelines
  - Use clear and concise language.
  - Don’t include your opinion as part of the question.
  - Avoid long or complex questions.
  - Avoid threatening questions.
Conduct the Interview

- Dress to match interviewee
- Arrive on time
  - Or early if need to confirm room setup
- Open interview by thanking interviewee
- State purpose and length of interview and how data will be used
- Monitor the time
- Ask follow-up questions
  - Probe until you understand
  - Ask about exception conditions ("what if...")
Discovery Prototyping

Discovery prototyping – the act of building a small-scale, representative or working model of the users’ requirements in order to discover or verify those requirements.
Joint Requirements Planning

Joint requirements planning (JRP) – 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 technique that encompasses the entire systems development process.
JRP Participants

- Sponsor
- Facilitator
- Users and Managers
- Scribes
- IT Staff
Steps to Plan a JRP Session

1. Selecting a location
   - Away from workplace when possible
   - Requires several rooms
   - Equipped with tables, chairs, whiteboard, overhead projectors
   - Needed computer equipment
2. Selecting the participants
   - Each needs release from regular duties
3. Preparing the agenda
   - Briefing documentation
   - Agenda distributed before each session
Guidelines for Conducting a JRP Session

- Do not unreasonably deviate 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
- Allow for ample breaks
- Encourage group consensus
- Encourage user and management participation without allowing individuals to dominate the session
- Make sure that attendees abide by the established ground rules for the session
Brainstorming

- Sometimes, one of the goals of a JRP session is to generate possible ideas to solve a problem.
  - Brainstorming is a common approach that is used for this purpose.

**Brainstorming** – a technique for generating ideas by encouraging participants to offer as many ideas as possible in a short period of time without any analysis until all the ideas have been exhausted.
Brainstorming Guidelines

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

1. Learn from existing documents, forms, reports, and files.
2. If appropriate, observe the system in action.
3. Given all the facts that already collected, design and distribute questionnaires to clear up things that aren’t fully understood.
4. Conduct interviews (or group work sessions).
5. (Optional). Build discovery prototypes for any functional requirements that are not understood or for requirements that need to be validated.
6. Follow up to verify facts.