

System Analysis and Design

Presented by

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Lecture 4

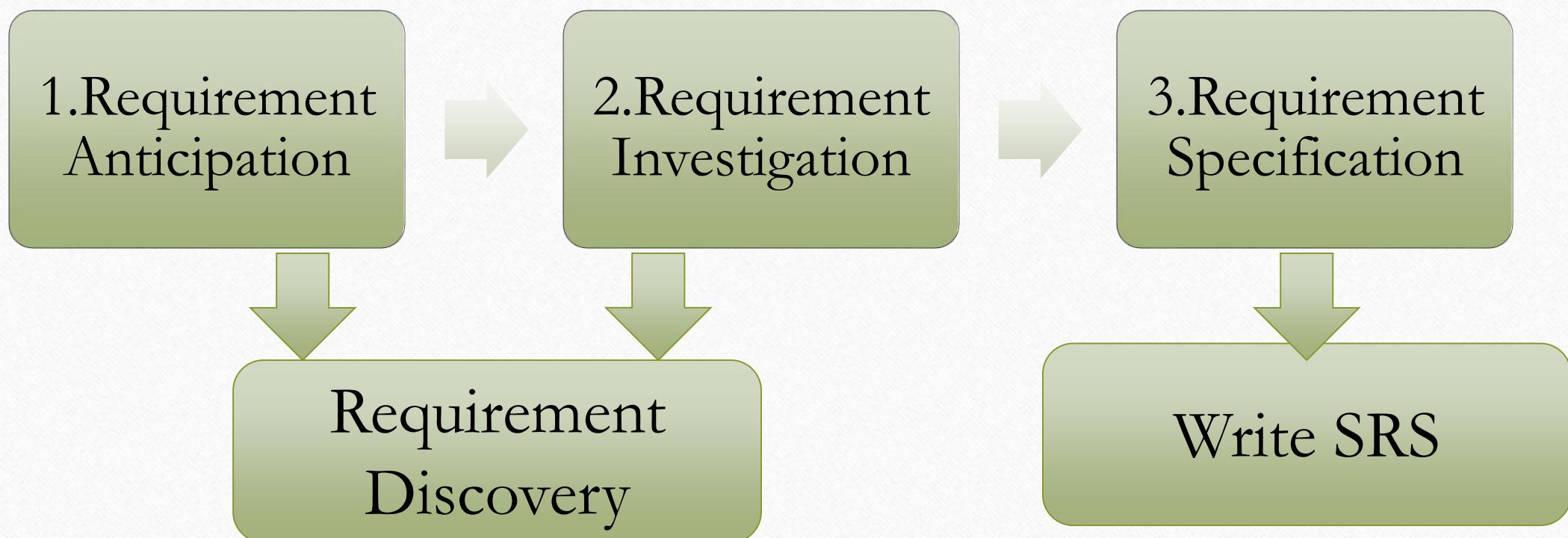
System analysis Activities

Feasibility Study



Requirement Determination

Requirement Determination



Requirement Discovery

Requirement Discovery it is one of the ***Requirement Determination*** phases. It is the process of identifying or extracting system problems and solution requirements from the user community.

Given an understand of problems, the system analyst can start to define the requirements by using Fact finding techniques.

Major Activities in Requirement Determination

Requirements Anticipation

- It predicts the characteristics of system based on previous experience which include certain problems or features and requirements for a new system.
- It can lead to analysis of areas that would otherwise go unnoticed by inexperienced analyst. But if shortcuts are taken and bias is introduced in conducting the investigation, then requirement Anticipation can be half-baked.

Major Activities in Requirement Determination

- **Requirements Investigation**
- It is studying the current system and documenting its features for further analysis.
- It is at the heart of system analysis where analyst documenting and describing system features using fact-finding techniques, prototyping, and computer assisted tools.

A Fact-Finding

- It is a formal process of using research , interview, questionnaire, sampling and other techniques to collect information about the system problems . It is also called information gathering or data collection.

A Fact-Finding Strategy

1. Learn from existing documents, forms, reports, and files.
2. If appropriate, observe the system in action.
3. Design and distribute questionnaires to clear up things that aren't fully understood.
4. Conduct interviews (or group work sessions).
5. 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.

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).
- Brainstorming

Questionnaires

Questionnaire – a special-purpose document that allows the analyst to collect information and opinions about various issues of system from large number of persons.

- Free-format questionnaire (open)** – 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(Closed)** – a questionnaire containing questions that require selecting an answer from predefined available responses.

Types of Fixed-Format Questions

- Multiple-choice questions

Is the current infrastructure report that you receive useful?

- Yes
- No

- Rating questions

The implementation of handheld entry devices would cause an increase in data accuracy.

- Strongly agree
- Agree
- No opinion
- Disagree
- Strongly disagree

Types of Fixed-Format Questions

- **Ranking questions**

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

- % making maps
- % entering data
- % overlay analysis
- % data editing

RMO Questionnaire

This questionnaire is being sent to all telephone-order sales personnel. As you know, RMO is developing a new customer support system for order taking and customer service.

The purpose of this questionnaire is to obtain preliminary information to assist in defining the requirements for the new system. Follow-up discussions will be held to permit everybody to elaborate on the system requirements.

Part I. Answer these questions based on a typical four-hour shift.

1. How many phone calls do you receive? _____
2. How many phone calls are necessary to place an order for a product? _____
3. How many phone calls are for information about RMO products, that is, questions only? _____
4. Estimate how many times during a shift customers request items that are out of stock. _____
5. Of those out-of-stock requests, what percentage of the time does the customer desire to put the item on back order? _____ %
6. How many times does a customer try to order from an expired catalog? _____
7. How many times does a customer cancel an order in the middle of the conversation? _____
8. How many times does an order get denied due to bad credit? _____

Part II. Circle the appropriate number on the scale from 1 to 7 based on how strongly you agree or disagree with the statement.

Question	Strongly Agree					Strongly Disagree		
It would help me do my job better to have longer descriptions of products available while talking to a customer.	1	2	3	4	5	6	7	
It would help me do my job better if I had the past purchase history of the customer available.	1	2	3	4	5	6	7	
I could provide better service to the customer if I had information about accessories that were appropriate for the items ordered.	1	2	3	4	5	6	7	
The computer response time is slow and causes difficulties in responding to customer requests.	1	2	3	4	5	6	7	

Part III. Please enter your opinions and comments.

Please briefly identify the problems with the current system that you would like to see resolved in a new system.

Advantages

- Often can be answered quickly
- It is useful to determine the overall opinion.
- Relatively inexpensive way to gather data from a large number
- It is more reliable and provides high confidentiality of honest responses.
- It is useful in situation to know what proportion of a given group approves or disapproves of a particular feature of the proposed system.

Disadvantages

- No guarantee that an individual will answer all questions
- No opportunity to reword or explain misunderstood questions
- Cannot observe body language
- Difficult to prepare

Types of Questionnaires

1. Exploratory questionnaires

the data to be collected is qualitative or is not to be statistically evaluated, it may be that no formal questionnaire is needed.

2. Formal standardized questionnaires:

The data is to be analyzed statistically, a formal standardized questionnaire is designed

Developing a Questionnaire

1. Determine what facts and opinions must be collected and from whom.
2. Determine whether free- or fixed-format questions will produce the best answers.
3. Write the questions.
4. Test the questions.
5. Duplicate and distribute the questionnaire.

Preliminary decisions in questionnaire design

1. Decide the information required.
2. Define the target respondents.
3. Choose the method(s) of reaching your target respondents.
4. Decide on question content.
- 5. Develop the question wording.**
6. Put questions into a meaningful order and format.
7. Check the length of the questionnaire.
8. Pre-test the questionnaire.

Survey Questions Types

Closed-ended question

- It consists of questions that are used when the systems analyst effectively lists all possible responses, which are mutually exclusive.

Closed-ended question Disadvantages

- They do not allow the respondent the opportunity to give a different response to those suggested.
- They 'suggest' answers that respondents may not have considered before.

Survey Questions Types

Closed-ended question advantages

- It provides the respondent with an easy method of indicating his answer - he does not have to think about how to articulate his answer.
- It 'prompts' the respondent so that the respondent has to rely less on memory in answering a question.
- Responses can be easily classified, making analysis very straightforward.
- It permits the respondent to specify the answer categories most suitable for their purposes.

Survey Questions Types

Open- ended questions

- It consists of questions that can be easily and correctly interpreted. They can explore a problem and lead to a specific direction of answer. With open-ended questions the respondent is asked to give a reply to a question in his/her own words. No answers are suggested.
- Example: "What do you like most about this implement?"

Survey Questions Types

Open-ended questions advantages

- They allow the respondent to answer in his own words, with no influence by any specific alternatives suggested by the interviewer.
- They often reveal the issues which are most important to the respondent, and this may reveal findings which were not originally anticipated when the survey was initiated.
- Respondents can 'qualify' their answers or emphasize the strength of their opinions.

Survey Questions Types

Open-ended questions disadvantages

- Respondents may find it difficult to 'articulate' their responses.
- Respondents may not give a full answer simply because they may forget to mention important points.
- Data collected is in the form of verbatim comments - it has to be coded and reduced to manageable categories. This can be time consuming for analysis and there are numerous opportunities for error in recording and interpreting the answers given on the part of interviewers.

Survey Questions Types

open response-option questions

open response-option questions largely eliminate the disadvantages of both the mentioned types of question. An open response-option is a form of question which is both open-ended and includes specific response-options as well. For example,

- What features of this implement do you like?
 - Performance
 - Quality
 - Price
 - Weight
 - Others mentioned

Survey Questions Types

Open response-option questions advantages

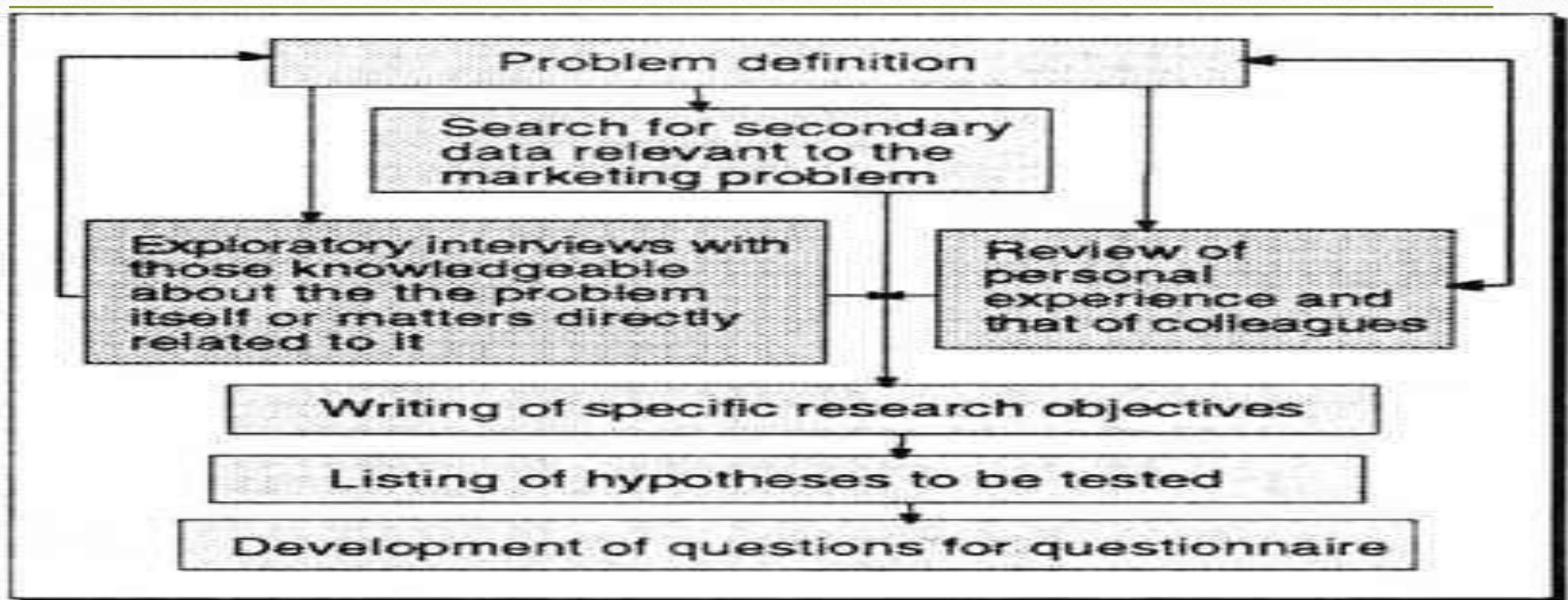
- The researcher can avoid the potential problems of poor memory or poor articulation by then subsequently being able to prompt the respondent into considering particular response options.
- Recording during interview is relatively straightforward.

Survey Questions Types

Open response-option questions disadvantage

it requires the researcher to have a good prior knowledge of the subject in order to generate realistic/likely response options before printing the questionnaire. However, if this understanding is achieved the data collection and analysis process can be significantly eased.

The steps preceding questionnaire design



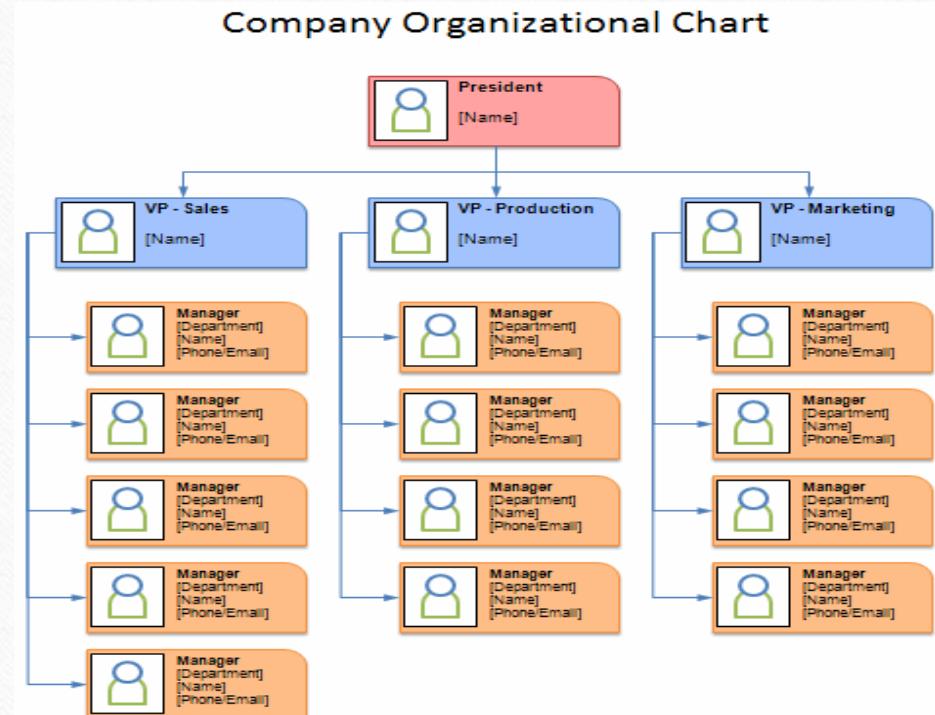
Good Questionnaire

- A well-designed questionnaire should meet the research objectives.
- It should obtain the most complete and accurate information possible.
- A well-designed questionnaire should make it easy for respondents to give the necessary information and for the interviewer to record the answer.
- It would keep the interview brief and to the point and be so arranged

Sampling Existing Documentation, Forms, & Files

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

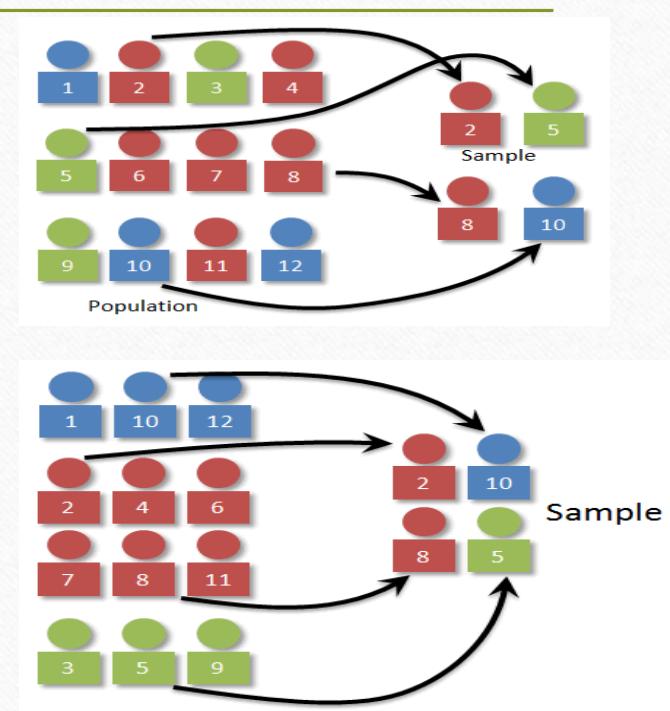
- Organization chart
- Memos and other documents that describe the problem
- Standard operating procedures for current system
- Completed forms
- Manual and computerized screens and reports
- Samples of databases
- Flowcharts and other system documentation
- And more



Sampling Techniques

Randomization – a sampling technique characterized by having no predetermined pattern or plan for selecting sample data.

Stratification – a systematic sampling technique that attempts to reduce the variance of the estimates by spreading out the sampling—for example, choosing documents or records by formula—and by avoiding very high or low estimates.



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 Types

Passive Observations

Standing back, out of the way of the activity, and not engaging in the process would be passive observation. The analyst will just watch and take records without asking any questions to the operator or end users.

Active Observations

When the analyst gets involved in the process in some way, this is active observation. This can be in the form of asking questions between actions to get inside the action.

Advantages

- Data gathered can be very reliable
- Can see exactly what is being done in complex tasks
- Relatively inexpensive compared with other techniques
- Can do work measurements

Disadvantages

- People may perform differently when being observed
- Work observed may not be representative of normal conditions
- Timing can be inconvenient
- Interruptions
- Some tasks not always performed the same way
- May observe wrong way of doing things

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.

Observation Guidelines

- Figure out **what data to collect**, whether it's looking for events, inputs, pain points, documenting processes; your analyst needs to know what to look for
- Decide **how to make observations**, whether it be passive or active. We'll cover this more later
- Choose the best **time for observing the process**; you'll probably want to be present at a normal time and at peak operations to understand any stressors
- Pick a **method of data collection**, such as note taking, voice recording, or taking a video. Which one works best will depend on the process being observed

Interviews

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

Importance:

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

Types of Interviews and Questions

- **Unstructured interview** –conducted with only a general goal or subject in mind and with few, if any, specific questions.
- **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.

Advantages

- Give analyst opportunity to motivate interviewee to respond freely and openly
- Allow analyst to inquiry for more feedback
- It is easy to discover key problem by seeking opinions.
- It bridges the gaps in the areas of misunderstandings and minimizes future problems.

Disadvantages

- Time-consuming
- Success highly dependent on analyst's human relations skills
- May be impractical due to location of interviewees

Procedure to Conduct an Interview

1. Select Interviewees “Carefully examine the job description”

- End users
- Learn about individual prior to the interview

2. Consider why you are interviewing and your qualifications

- Interview Purpose

3. Perform research on the company and role

- Research the product or service
- Research the role
- Research the company culture

Procedure to Conduct an Interview

4. Conduct the Interview

- Summarize the problem
- Offer an incentive for participation
- Ask the interviewee for assistance

5. Practice your speaking voice and body language

You can do this by practicing a confident, strong speaking voice and friendly, open body language.

Procedure to Conduct an Interview

6. Consider your answers to common interview questions

While you won't be able to predict every question you'll be asked in an interview, there are a few common questions you can plan answers for.

7. Follow Up on the Interview

- Memo that summarizes the interview

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

- 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.
- Thank the participants.
- Follow up on open and unanswered questions.

Discussion and Interview Agenda

Setting

Objective of Interview

Determine processing rules for sales commission rates

Date, Time, and Location

April 21, 2012, at 9:00 a.m. in William McDougal's office

User Participants (names and titles/positions)

William McDougal, vice president of marketing and sales, and several of his staff

Project Team Participants

Mary Ellen Green and Jim Williams

Interview/Discussion

- 1. Who is eligible for sales commissions?*
- 2. What is the basis for commissions? What rates are paid?*
- 3. How is commission for returns handled?*
- 4. Are there special incentives? Contests? Programs based on time?*
- 5. Is there a variable scale for commissions? Are there quotas?*
- 6. What are the exceptions?*

Follow-Up

Important decisions or answers to questions

See attached write-up on commission policies

Open items not resolved with assignments for solution

See Item numbers 2 and 3 on open items list

Date and time of next meeting or follow-up session

April 28, 2012, at 9:00 a.m.

Prepare for the Interview

- **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.
- Don't use “you” when you mean a group of people.

Do

- Dress appropriately
- Be friendly
- Listen carefully
- Maintain control of the interview
- Inquiry
- Observe mannerisms and nonverbal communication
- Be patient
- Keep interviewee at ease
- Maintain self-control
- Finish on time

Don't

- Assume an answer is finished or leading nowhere
- Use jargon
- Reveal personal biases
- Talk more than listen
- Assume anything about the topic or the interviewee
- Tape record (take notes instead)

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.

Advantages

- Can experiment to develop understanding of how system might work
- Aids in determining feasibility and usefulness of system before development
- Serves as training mechanism
- Aids in building test plans and scenarios
- May minimize time spent on fact-finding

Disadvantages

- Developers may need to be trained in prototyping
- Users may develop unrealistic expectations
- Could extend development schedule

Secondary Research or Background Reading

This method is widely used for information gathering by accessing the gleaned information. It includes any previously gathered information used by the marketer from any internal or external source.

Secondary Research or Background Reading

Advantages

- It is more openly accessed with the availability of internet.
- It provides valuable information with low cost and time.
- It is used by the researcher to conclude if the research is worth it as it is available with procedures used and issues in collecting them.

Joint Requirements Planning (JRP)

Joint requirements planning (JRP) – a process whereby highly structured group meetings are conducted for the purpose of analyzing problems and defining requirements.

It is a **technique for drawing out user requirements through joint planning sessions of software users and information technology personnel**. These informal sessions are workshops that provide an open environment for people to discuss what they do, how they do it, and what critical information they need to support their job responsibilities. Written documentation defining these requirements results from a JRP session.

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

Advantages of Joint Requirements Planning (JRP)

- Encouraging a **partnership of business and software experts**
- Enabling the business side to **identify and define their needs** of the software
- **Reducing design and development time** by clarifying software requirements up front
- **Driving software architecture** and platform decisions
- **Lowering deployment and maintenance costs** by resolving issues early in the system life cycle
- Improving the **quality of the solution** by combining the ideas of a variety of people
- Increasing end user and project team knowledge of the system and **satisfaction with the result**

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 breaks
- Encourage group consensus
- Encourage user and management participation
- Make sure that attendees abide by the established ground rules for the session

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

JRP vs JAD

Both **Joint Application Development (JAD)** and **JRP** are techniques used to speed up the development process of a SW design. They are almost same except very few changes

- JRP doesn't include technical details it is about what is needed to complete the process successfully . But JAD includes technical details how it should be done.
- JRP is more concentrated towards the business process and typically its of shorter duration. But JAD includes building of UI prototype

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.

Time for
Questions

Thank you!

