



SOOAD

UNIT 1

THE SYSTEM ANALYST AND INFORMATION SYSTEM DEVELOPMENT

The System Analyst and Information Systems

- Introduction
- The System Analyst
- The Software Development Life Cycle & Deliverables
- Feasibility Analysis
- Introduction to Requirements Determination
- Requirement elicitation techniques

Introduction to Requirements Determination

Requirements determination involves studying the existing system and gathering details to find out what are the requirements, how it works, and where improvements should be made. which include certain problems or features and requirements for a new system.

- Requirements determination is the **beginning sub phase of analysis**.
- In this sub phase, **analysts should gather information** on what the system should do from as many sources as possible.
- There are some **traditional methods** to help collecting system requirements, such as interviewing, survey, directly observing users, etc.
- Nowadays, some **modern requirements collecting methods**, such as JAD and prototyping, emerged.

What is a Requirement?

It is simply a statement of what the system must do or what characteristics it needs to have.

Categories of Requirement

- Business (what business needs)
- User (what user needs to)
- Functional (what software would do)
- Non functional (what system will have)
- System (how the system should be built)



Requirements Elicitation Techniques

Requirement Elicitation Techniques

- Elicitation is the process of discovering the requirements.
- Requirements elicitation Activities:
Requirements elicitation includes the subsequent activities. Few of them are listed below –
 - Knowledge of the overall area where the systems is applied.
 - The details of the precise customer problem where the system are going to be applied must be understood.
 - Interaction of system with external requirements.
 - Detailed investigation of user needs.
 - Define the constraints for system development.

Requirement Elicitation Techniques

Requirements are gathered by System Analyst.

- First, the analyst should recognize that **important side effects of the requirements definition process** include building political support for the project and establishing trust and support between the project team and the ultimate users of the system.
- Second, the analyst **should carefully determine who is included in the requirements definition process**. This might include managers, employees, staff members, and even some customers and suppliers.
- Finally, do everything possible to **respect the time commitment** that you are asking the participants to make. The best way to do this is to be fully prepared and to make good use of all the types of requirements elicitation techniques.

Requirement Elicitation Techniques

Five most commonly used requirements elicitation techniques:

- Interviews
- Joint Application Development
- Questionnaires
- Document Analysis
- Observation

Interviews

- Objective of conducting an interview is to understand the customer's expectations from the software.
- It is impossible to interview every stakeholder hence representatives from groups are selected based on their expertise and credibility.
- Interviews maybe be open-ended or structured.
 - In open-ended interviews there is no pre-set agenda. Context free questions may be asked to understand the problem.
 - In structured interview, agenda of fairly open questions is prepared. Sometimes a proper questionnaire is designed for the interview.

Interviews

- Interviews are conducted **one on one** but sometimes, due to time constraints, **several people are interviewed at the same time.**
- There are five basic steps to the interview process:
 - **Selecting interviewees**
 - **Designing interview questions**
 - **Preparing for the interview**
 - **Conducting the interview**
 - **Post interview follow-up.**

Interviews – Selecting Interviewees

- An **interview schedule should be created**, listing who will be interviewed, the purpose of the interview, and where and when it will take place.
- The **schedule can be an informal list** that is used to help set up meeting times or a formal list that is incorporated into the work plan.
- The people who appear on the interview schedule are **selected on the basis of the analyst's information needs**.
- **The project sponsor, key business users, and other members of the project team can help the analyst** determine who in the organization can best provide important information about requirements.
- These people are **listed on the interview schedule in the order in which they should be interviewed**.

Interviews – Selecting Interviewees

- It is common to begin by interviewing one or two senior managers to get a strategic view and then move to mid-level managers who can provide broad, overarching information about the business process and the expected role of the system being developed.
- Once the analyst has a good understanding of the big picture, lower-level managers and staff members can fill in the exact details of how the process works.
- Like most other things about systems analysis, this is an iterative process—starting with senior managers, moving to midlevel managers, then staff members, back to mid-level managers, and so on, depending upon what information is needed along the way

Interviews – Designing Interview Questions

- There are three types of interview questions:
 - closed-ended questions
 - open-ended questions
 - probing questions.

Interviews – Designing Interview Questions

- **Closed ended questions:**
 - Closed-ended questions require a specific answer.
 - Similar to multiple choice or arithmetic questions on an exam.
 - Used when the analyst is looking for specific, precise information
 - In general, precise questions are best.
 - For example, rather than asking “Do you handle a lot of requests?” It is better to ask “How many requests do you process per day?”

Closed-ended questions enable analysts to control the interview and obtain the information they need

Interviews – Designing Interview Questions

- **Open ended questions:**
 - That leave room for elaboration on the part of the interviewee.
 - Similar in many ways to essay questions that you might find on an exam.
 - Designed to gather rich information and give the interviewee more control over the information that is revealed during the interview.
 - For example: “What do you think about the way the invoices are currently processed?”

Interviews – Designing Interview Questions

- **Probing questions:**
 - Probing questions follow up on what has just been discussed in order for the interviewer to learn more.
 - Often are used when the interviewer is unclear about an interviewee's answer.
 - They encourage the interviewee to expand on or to confirm information from a previous response, and they are a signal that the interviewer is listening and interested in the topic under discussion.
 - For example: “Why?”, “Can you give me an example?”

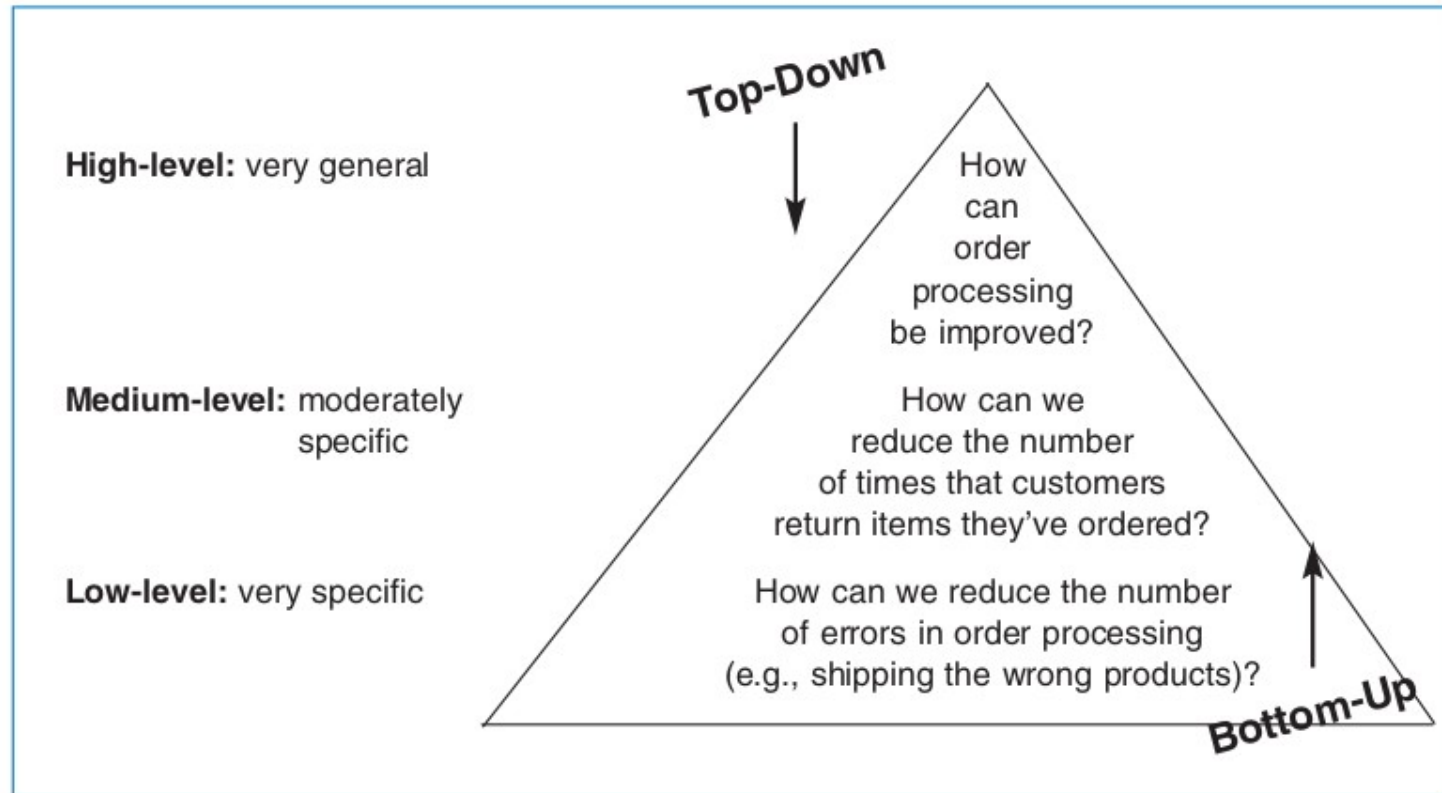
Interviews – Designing Interview Questions

- In general, you **should not ask** questions about information **that is readily available** from other sources.
- Your interview questions should **anticipate the type of information** the interviewee is likely to know.
- **No type of question is better than another**, and usually a combination of questions is used during an interview.
- As the project progresses, the analyst comes to understand the business process much better, and he or she needs very specific information about how business processes are performed.
- No matter what kind of interview is being conducted, interview **questions must be organized into a logical sequence** so that the interview flows well.

Interviews – Designing Interview Questions

- There are two fundamental approaches to organizing the interview questions:
 - Top-down
 - Bottom-up
- With the top-down interview, the interviewer starts with broad, general issues and gradually works towards more specific ones.
- With the bottom-up interview, the interviewer starts with very specific questions and moves to broad questions.

Interviews – Designing Interview Questions



Interviews – Designing Interview Questions

- The top-down approach enables the interviewee to become accustomed to the topic before he or she needs to provide specifics.
- It also enables the interviewer to understand the issues before moving to the details, because the interviewer may not have sufficient information at the start of the interview to ask very specific questions.
- Perhaps most importantly, the topdown approach enables the interviewee to raise a set of big-picture issues before becoming enmeshed in details, so the interviewer is less likely to miss important issues.
- One case in which the bottom-up strategy may be preferred is when the analyst already has gathered a lot of information about issues and just needs to fill in some holes with details.

Interviews – Preparing for the Interview

- It is important to prepare for the interview in the same way that **you would prepare to give a presentation.**
- You should have a **general interview plan** which lists the questions that you will ask in the appropriate order;
- **Confirm the areas in which the interviewee has knowledge** so you do not ask questions that he or she cannot answer.
- **Review the topic areas**, the questions, and the interview plan, and clearly decide which ones have the greatest priority in case you run out of time.
- In general, **structured interviews with closed-ended questions take more time to prepare than unstructured interviews.**
- When you schedule the interview, **inform the interviewee of the reason for the interview** and the areas you will be discussing far enough in advance so that he or she has time to think about the issues and organize his or her thoughts

Interviews – Conducting the Interview

- When you start the interview, the first goal is to **build rapport** with the interviewee.
- You should appear to be professional and an **unbiased**, independent seeker of information.
- It is critical to **carefully record all the information** that the interviewee provides.
- One potentially controversial issue is **whether or not to tape-record** the interview.
- Try to **recognize and define jargon**, and be sure to clarify jargon you do not understand.
- As the interview progresses, it is important that you **understand the issues that are discussed**.
- Finally, be sure to **separate facts from opinion**.

Interviews – Conducting the Interview

- One good strategy to increase your understanding during an interview is to **periodically summarize the key points** that the interviewee is communicating.
- This **avoids misunderstandings** and also demonstrates that you are listening.
- **As the interview draws to a close, be sure to give the interviewee time to ask questions or provide information that he or she thinks is important** but was not part of your interview plan.
- In most cases, the interviewee will have no additional concerns or information, but in some cases this will lead to unanticipated, but important information.

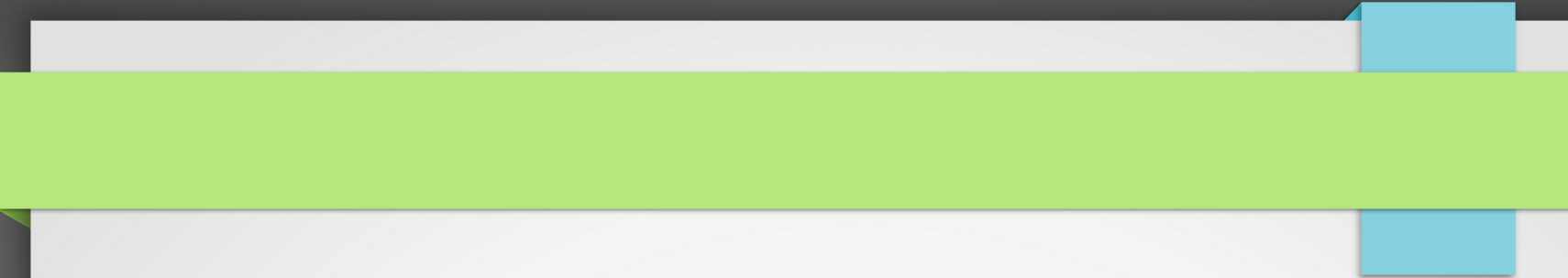
Interviews – Post – Interview Follow up

- After the interview is over, the analyst needs to prepare an interview report that describes the information from the interview.
- The report contains interview notes, information that was collected over the course of the interview and is summarized in a useful format.
- In general, the interview report should be written within 48 hours of the interview, because the longer you wait, the more likely you are to forget information.
- the interview report is sent to the interviewee with a request to read it and inform the analyst of clarifications or updates.

Never distribute someone's information without prior approval.

JAD – Joint Application Development

- Joint application development (or JAD as it is more commonly known) is an information gathering technique that allows the project team, users, and management to work together to identify requirements for the system.
- JAD is a structured process in which 10 to 20 users meet under the direction of a facilitator skilled in JAD techniques.
- The facilitator is a person who sets the meeting agenda and guides the discussion, but does not join in the discussion as a participant.
- He or she does not provide ideas or opinions on the topics under discussion and remains neutral during the session.
- The facilitator must be an expert in both group process techniques and systems analysis and design techniques.

- 
- This technique is more process-oriented and formal as compared to other techniques. These are structured meetings involving end-users, PMs, SMEs. This is used to define, clarify, and complete requirements.
 - This technique can be divided into the following categories:
 - **Formal Workshops:** These workshops are highly structured and are usually conducted with the selected group of stakeholders. The main focus of this workshop is to define, create, refine, and reach closure on business requirements.
 - **Business Process Improvement Workshops:** These are less formal as compared to the above one. Here, existing business processes are analyzed and process improvements are identified.

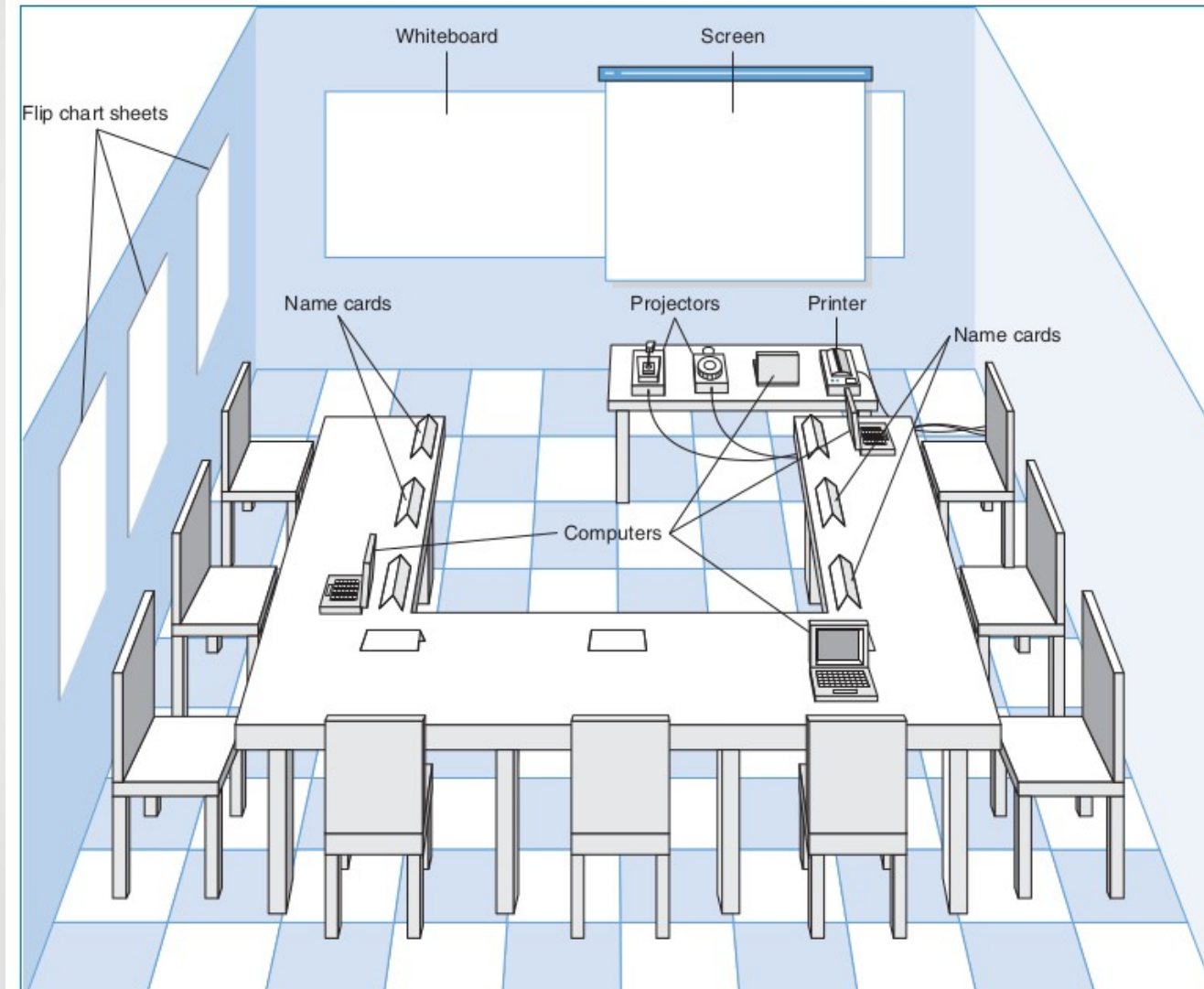
JAD – Joint Application Development

- One or two scribes assist the facilitator by recording notes, making copies, and so on.
- Often, the scribes will use computers and CASE tools to record information as the JAD session proceeds.
- One problem with JAD is that it suffers from the traditional problems associated with groups:
 - Sometimes people are reluctant to challenge the opinions of others,
 - a few people often dominate the discussion, and
 - not everyone participates.

JAD – Joint Application Development

- The JAD group **meets for several hours, several days, or several weeks** until all of the issues have been discussed and the needed information is collected.
- Most JAD sessions take place in a specially **prepared meeting room**, away from the participants' offices, so that they are not interrupted.
- The meeting room is usually **arranged in a U shape** so that all participants can easily see each other.

JAD – Joint Application Development



JAD – Joint Application Development

- In a 15-member group, for example, if everyone participates equally, then each person can talk for only 4 minutes each hour and must listen for the remaining 56 minutes—not a very efficient way to collect information.
- Electronic JAD or e-JAD:
 - In an e-JAD meeting room, each participant uses special software on a networked computer to anonymously submit ideas, view all ideas generated by the group, and rate and rank ideas through voting.
 - The facilitator uses the electronic tools of the e-JAD system to guide the group process, maintaining anonymity and enabling the group to focus on each idea's merits and not the power or rank of the person who contributed the idea.

JAD –Selecting Participants

- Selecting JAD participants is done in the same basic way as selecting interview participants.
- Participants are selected on the basis of information they can contribute, to provide a broad mix of organizational levels, and to build political support for the new system.
- The JAD facilitator is a consultant external to the organization because the organization may not have a regular day-to-day need for JAD or e-JAD expertise.

JAD –Designing the JAD Session

- JAD sessions can run from as **little as a half day to several weeks**, depending upon the size and scope of the project.
- In our experience, most JAD sessions tend to last 5 to 10 days spread over a 3-week period.
- Most e-JAD sessions tend to last 1 to 4 days in a 1-week period.
- JAD and e-JAD sessions usually **move beyond the collection of information into producing analysis deliverables**.
- For example, the users and the analysts collectively can create use cases, process models, or the requirements definition.
- **A difference between JAD and interviewing is that all JAD sessions are structured—they must be carefully planned.**

JAD –Preparing for the JAD Session

- As with interviewing, it is important to prepare the analysts and participants for the JAD session.
- Because the sessions can go beyond the depth of a typical interview and usually are conducted off-site, participants can be more concerned about how to prepare.
- If the goal of the JAD session, for example, is to develop an understanding of the current system, then participants can bring procedure manuals and documents with them.
- If the goal is to identify improvements for a system, then they can think about how they would improve the system prior to the JAD session.

JAD –Conducting for the JAD Session

- Most JAD sessions try to follow a formal agenda, and most have formal ground rules that define appropriate behavior.
- Common ground rules include following
 - the schedule,
 - respecting others' opinions,
 - accepting disagreement, and
 - ensuring that only one person talks at a time.

JAD –Conducting for the JAD Session

- The JAD facilitator performs three key functions.
- First, he or she ensures that the group sticks to the agenda.
- Second, the facilitator must help the group understand the technical terms and jargon that surround the system development process and help the participants understand the specific analysis techniques used.
- Third, the facilitator records the group's input on a public display area, which can be a whiteboard, flip chart, or computer display.

The facilitator must remain neutral at all times and simply help the group through the process

JAD –Conducting for the JAD Session

- It is common for the JAD participants to make use of a number of tools during the JAD session in order to fully define the new system.
- **Use cases** may be created to describe how the users will interact with the new system.
- **Prototypes** may be created to more fully understand the user interface or navigation through the system.
- **Process models** can be constructed to understand the software that will be developed, while a data model can be used to describe the data that will be captured and maintained.

Post JAD Followup

- As with interviews, a JAD post-session report is prepared and circulated among session attendees.
- The post-session report is essentially the same as the interview report.
- Since the JAD sessions are longer and provide more information, it usually takes a week or two after the JAD session before the report is complete.

Questionnaires

- A questionnaire is a set of written questions for obtaining information from individuals.
- Questionnaires often are used when there is a large number of people from whom information and opinions are needed.
- In our experience, questionnaires are commonly used for systems intended for use outside of the organization (e.g., by customers or vendors) or for systems with business users spread across many geographic locations.
- Most people automatically think of paper when they think of questionnaires, but today more questionnaires are being distributed in electronic form, either via e-mail or on the Web.
- Electronic distribution can save a significant amount of money, compared with distributing paper questionnaires.

Questionnaires

- For Survey/Questionnaire, a set of questions is given to stakeholders to quantify their thoughts. After collecting the responses from stakeholders, data is analyzed to identify the area of interest of stakeholders.
- Questions should be based on high priority risks. Questions should be direct and unambiguous. Once the survey is ready, notify the participants and remind them to participate.
- Two types of questions can be used here:
 - **Open-Ended:** Respondent is given the freedom to provide answers in their own words rather than selecting from predefined responses. This is useful but at the same time, this is time- consuming as interpreting the responses is difficult.
 - **Close Ended:** It includes a predefined set of answers for all the questions and the respondent has to choose from those answers. Questions can be multiple choice or can be ranked from not important to very important.

Questionnaires – Selecting Participants

- As with interviews and JAD sessions, the first step is to **select the individuals** to whom the questionnaire will be sent.
- It is not usual to select every person who could provide useful information.
- The standard approach is to **select a sample, or subset, of people who are representative of the entire group.**
- The important point in selecting a sample, however, is to realize that not everyone who receives a questionnaire will actually complete it.
- On average, **only 30%–50% of paper and e-mail questionnaires are returned.**
- **Response rates for Web-based questionnaires tend to be significantly lower (often, only 5%–30%).**

Questionnaires – Designing the Questionnaire

- **Developing good questions is critical for questionnaires** because the information on a questionnaire cannot be immediately clarified for a confused respondent.
- Questions on questionnaires **must be very clearly written** and must leave little room for misunderstanding; therefore, closed-ended questions tend to be most commonly used.
- Questions **must enable the analyst to clearly separate facts from opinions.**
- Questions **should be relatively consistent** in style so that the respondent does not have to read instructions for each question before answering it.
- Some experts suggest that **questionnaires should start with questions important to respondents**, so that the questionnaire immediately grabs their interest and induces them to answer it.

Questionnaires – Administering the Questionnaire

- The key issue in administering the questionnaire is getting participants to complete the questionnaire and send it back.
- Commonly used techniques include
 - clearly explaining why the questionnaire is being conducted
 - why the respondent has been selected;
 - stating a date by which the questionnaire is to be returned;
 - offering an inducement to complete the questionnaire
 - offering to supply a summary of the questionnaire responses.

Questionnaires – Questionnaire Followup

- It is helpful to process the returned questionnaires and develop a questionnaire report soon after the questionnaire deadline.
- This ensures that the analysis process proceeds in a timely fashion and that respondents who requested copies of the results receive them promptly.

Document Analysis

- Project teams often use document analysis to understand the as-is system.
- Unfortunately, most systems are not well documented, because project teams fail to document their projects along the way, and when the projects are over, there is no time to go back and document.
- Therefore, there may not be much technical documentation about the current system available, or it may not contain updated information about recent system changes.
- There are many helpful documents that do exist in the organization: paper reports, memorandums, policy manuals, user training manuals, organization charts, and forms.

Document Analysis

- This analysis is helpful to validate the implementation of current solutions and is also helpful in understanding the business need.
- Document analysis includes reviewing the business plans, technical documents, problem reports, existing requirement documents, etc.
- This is useful when the plan is to update an existing system. This technique is useful for migration projects.
- This technique is important in identifying the gaps in the system i.e. to compare the AS-IS process with the TO-BE process.
- This analysis also helps when the person who has prepared the existing documentation is no longer present in the system.

Observations

- Observation, the act of watching processes being performed.
- The main objective of the observation session is to understand the activity, task, tools used, and events performed by others.
- a powerful tool to gain insight into the as-is system.
- During the session, the observer should record all the activities and the time taken to perform the work by others so that he/she can simulate the same.
- Observation is a good way to check the validity of information gathered from other sources such as interviews and questionnaires.
- Observation is often used to supplement interview information.

Observations

- Observation can be either active or passive.
 - Active observation is to ask questions and try to attempt the work that other persons are doing.
 - Passive observation is silent observation i.e. you sit with others and just observe how they are doing their work without interpreting them.