CHAPTER

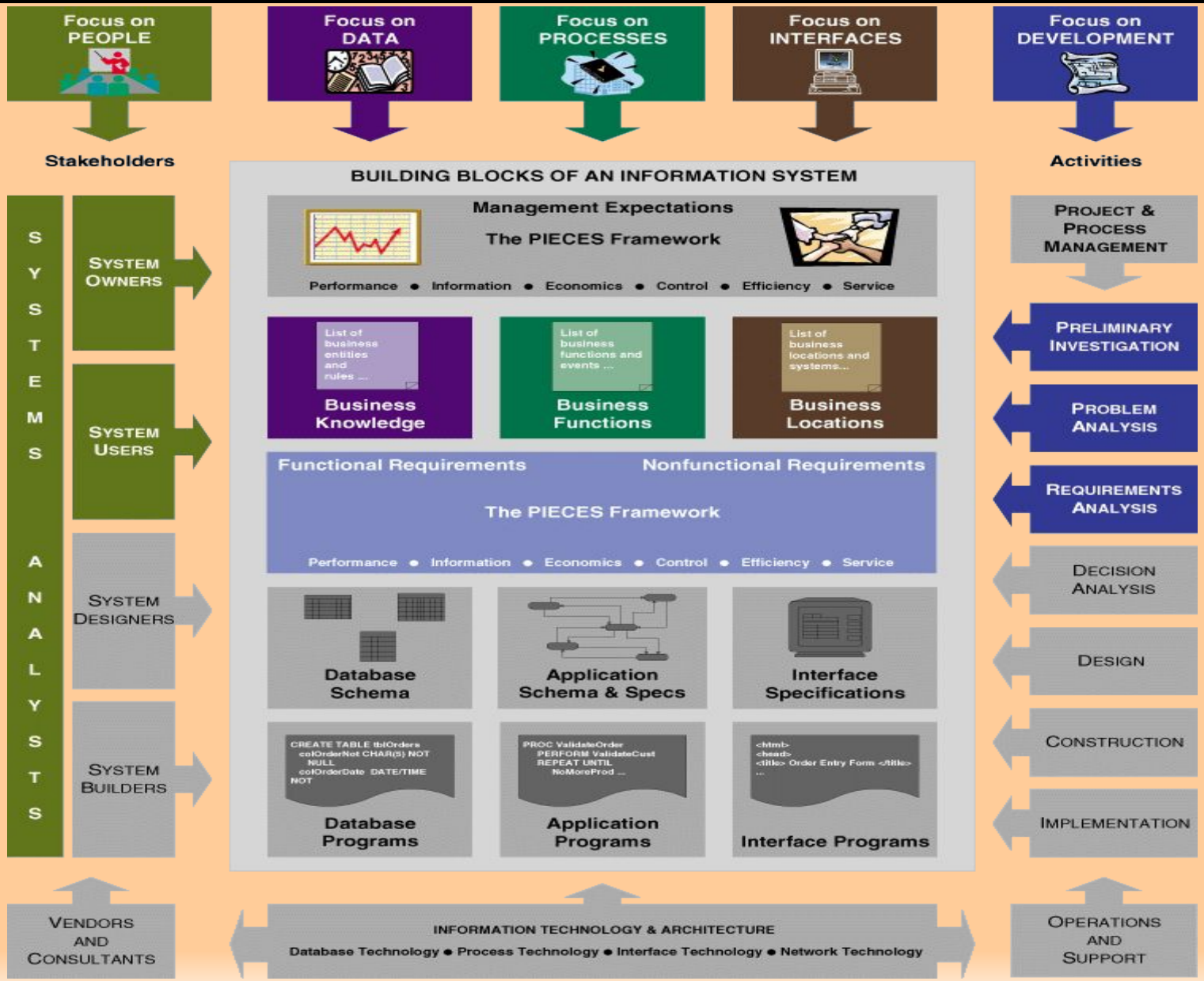
5

REQUIREMENTS DISCOVERY

Chapter Six Requirements Discovery

- Define system requirements and differentiate between functional and nonfunctional requirements.
- Understand the activity of problem analysis and be able to create an Ishikawa (fishbone) diagram to aid in problem solving.
- Understand the concept of requirements management.
- Identify seven fact-finding techniques and characterize the advantages and disadvantages of each.
- Understand six guidelines for doing effective listening.
- Understand what body language and proxemics are, and why a systems analyst should care.
- Characterize the typical participants in a JRP session and describe their roles.
- Complete the planning process for a JRP session, including selecting and equipping the location, selecting the participants, and preparing an agenda to guide the JRP session.
- Describe several benefits of using JRP as a fact-finding technique.
- Describe a fact-finding strategy that will make the most of your time with end-users.
- Describe various techniques to document and analyze requirements.
- Understand use cases and be able to document them.

Chapter Map



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. 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).

Sampling

- 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:
    - Sample Size = 0.25(1.645/0.10)2 = 68
  - Note that .25 assumes a 50/50 probability of a deviation from the norm. This is a conservative estimate. If you know that there are fewer variations, you can use p(1-p) instead of .25, where p is the probability of a variation.
  - The certainty factor is related to the pdf of the standard normal distribution. It is the positive extreme value, when the area under the pdf is equal to the confidence level.

Sampling Techniques

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

Stratification is 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 is 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 is 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 or managers.
- Inform those who will be observed of the purpose of the observation.
- Keep a low profile.
- Take notes during or immediately following the observation.
- Review observation notes with appropriate individuals.
- Don't interrupt the individuals at work.
- Don't focus heavily on trivial activities.
- Don't make assumptions.

The Hawthorne Effect

- Individual behaviors may be altered because they know they are being studied. This was demonstrated in a research project (1927 - 1932) of the Hawthorne Plant of the Western Electric Company in Cicero, Illinois. This series of research, first led by Harvard Business School professor Elton Mayo, examined the physical and environmental influences of the workplace (e.g. brightness of lights, humidity) and later, moved into the psychological aspects (e.g. breaks, group pressure, working hours, managerial leadership).
- The major finding of the study was that **almost regardless of the experimental manipulation employed, the production of the workers seemed to improve**. One reasonable conclusion is that the workers were pleased to receive attention from the researchers who expressed an interest in them.
- (Adapted from Donald Clark's Big Dog Human Resources Training Page)

Questionnaires

Questionnaires are special-purpose documents that allow the analyst to collect information and opinions from respondents.

- Advantages?
- Disadvantages?

Questionnaires

Advantages

- Most questionnaires can be answered quickly. People can complete and return questionnaires at their convenience.
- Questionnaires are a relatively inexpensive means of gathering data from a large number of individuals.
- Questionnaires allow individuals to maintain anonymity. Therefore, individuals are more likely to provide the real facts, rather than telling you what they think their boss would want them to.
- Responses can be tabulated and analyzed quickly.

Disadvantages

- The number of respondents is often low.
- There's no guarantee that an individual will answer or expand on all of the questions.
- Questionnaires tend to be inflexible. There's no opportunity for the systems analyst to obtain voluntary information from individuals or to reword questions that may have been misinterpreted.
- It's not possible for the systems analyst to observe and analyze the respondent's body language.
- There is no immediate opportunity to clarify a vague or incomplete answer to any question.
- Good questionnaires are difficult to prepare.

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.

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

Questionnaire Procedure

1. Determine what facts and opinions must be collected and from whom you should get them.
2. Based on the needed facts and opinions, 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

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

- Advantages?
- Disadvantages?

Interviews

Advantages

- Interviews give the analyst an opportunity to motivate the interviewee to respond freely and openly to questions. By establishing rapport, the systems analyst is able to give the interviewee a feeling of actively contributing to the systems project.
- Interviews allow the systems analyst to probe for more feedback from the interviewee.
- Interviews permit the systems analyst to adapt or reword questions for each individual.
- Interviews give the analyst an opportunity to observe the interviewee's nonverbal communication. A good systems analyst may be able to obtain information by observing the interviewee's body movements and facial expressions as well as by listening to verbal replies to questions.

Disadvantages

- Interviewing is a very time-consuming, and therefore a costly, fact-finding approach.
- Success of interviews is highly dependent on the systems analyst's human relations skills.
- Interviewing may be impractical due to the location of interviewees.

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

1. Select Interviewees
2. Prepare for the Interview
    1. An interview guide is a checklist of specific questions the interviewer will ask the interviewee.
3. Conduct the Interview
4. Follow Up on the Interview

Interview Questions

- 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.
  - Don't use "you" when you mean a group of people.

Sample Interview Guide

Interviewee: Jeff Bentley, Accounts Receivable Manager
Date: Tuesday, March, 23, 2000
Time: 1:30 P.M.
Place: Room 223, Admin. Bldg.
Subject: Current Credit-Checking Policy

Time Allocated	Interviewer Question of Objective	Interviewee Response
1 to 2 min.	**Objective** Open the interview: • Introduce Ourselves • Thank Mr. Bentley for his valuable time • State the purpose of the interview--to obtain an understanding of the existing credit-checking policies	
5 min.	**Question 1** What conditions determine whether a customer's order is approved for credit? **Follow-up**	
5 min.	**Question 2** What are the possible decisions or actions that might be taken once these conditions have been evaluated? **Follow-up**	
3 min.	**Question 3** How are customers notified when credit is not approved for their order? **Follow-up**	

(continued)

Sample Interview Guide (concluded)

1 min.	**Question 4** After a new order is approved for credit and placed in the file containing orders that can be filled, a customer might request that a modification be made to the order. Would the order have to go through credit approval again if the new total order cost exceeds the original cost? **Follow-up**	
1 min.	**Question 5** Who are the individuals that perform the credit checks? **Follow-up**	
1 to 3 mins.	**Question 6** May I have permission to talk to those individuals to learn specifically how they carry out the credit-checking process? **Follow-up**	
1 min.	**Objective** Conclude the interview: • Thank Mr. Bentley for his cooperation and assure him that he will be receiving a copy of what transpired during the interview	
21 minutes	Time allotted for base questions and objectives.	
9 minutes	Time allotted for follow-up questions and redirection	
30 minutes	Total time allotted for interview (1:30 p.m. to 2:00 p.m.)	

General Comments and Notes:

Interviewing Do's and Don'ts

Do	Avoid
• Be courteous • Listen carefully • Maintain control • Probe • Observe mannerisms and nonverbal communication • Be patient • Keep interviewee at ease • Maintain self-control	• Continuing an interview unnecessarily. • Assuming an answer is finished or leading nowhere. • Revealing verbal and nonverbal clues. • Using jargon • 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 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 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—closer than 1.5 feet
- Personal zone—from 1.5 feet to 4 feet
- Social zone—from 4 feet to 12 feet
- Public zone—beyond 12 feet

Discovery Prototyping

Discovery prototyping is the act of building a small-scale, representative or working model of the users' requirements in order to discover or verify those requirements.

- Advantages?
- Disadvantages?

Discovery Prototyping

Advantages

- Allows users and developers to experiment with the software and develop an understanding of how the system might work.
- Aids in determining the feasibility and usefulness of the system before high development costs are incurred.
- Serves as a training mechanism for users.
- Aids in building system test plans and scenarios to be used last in the system testing process.
- May minimize the time spent on fact-finding and help define more stable and reliable requirements.

Disadvantages

- Developers may need to be trained in the prototyping approach.
- Users may develop unrealistic expectations based on the performance, reliability, and features of the prototype. Prototypes can only simulate system functionality and are incomplete in nature. Care must be taken to educate the users about this fact and not to mislead them.
- Doing prototyping may extend the development schedule and increase the development costs.

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 technique that encompasses the entire systems development process.

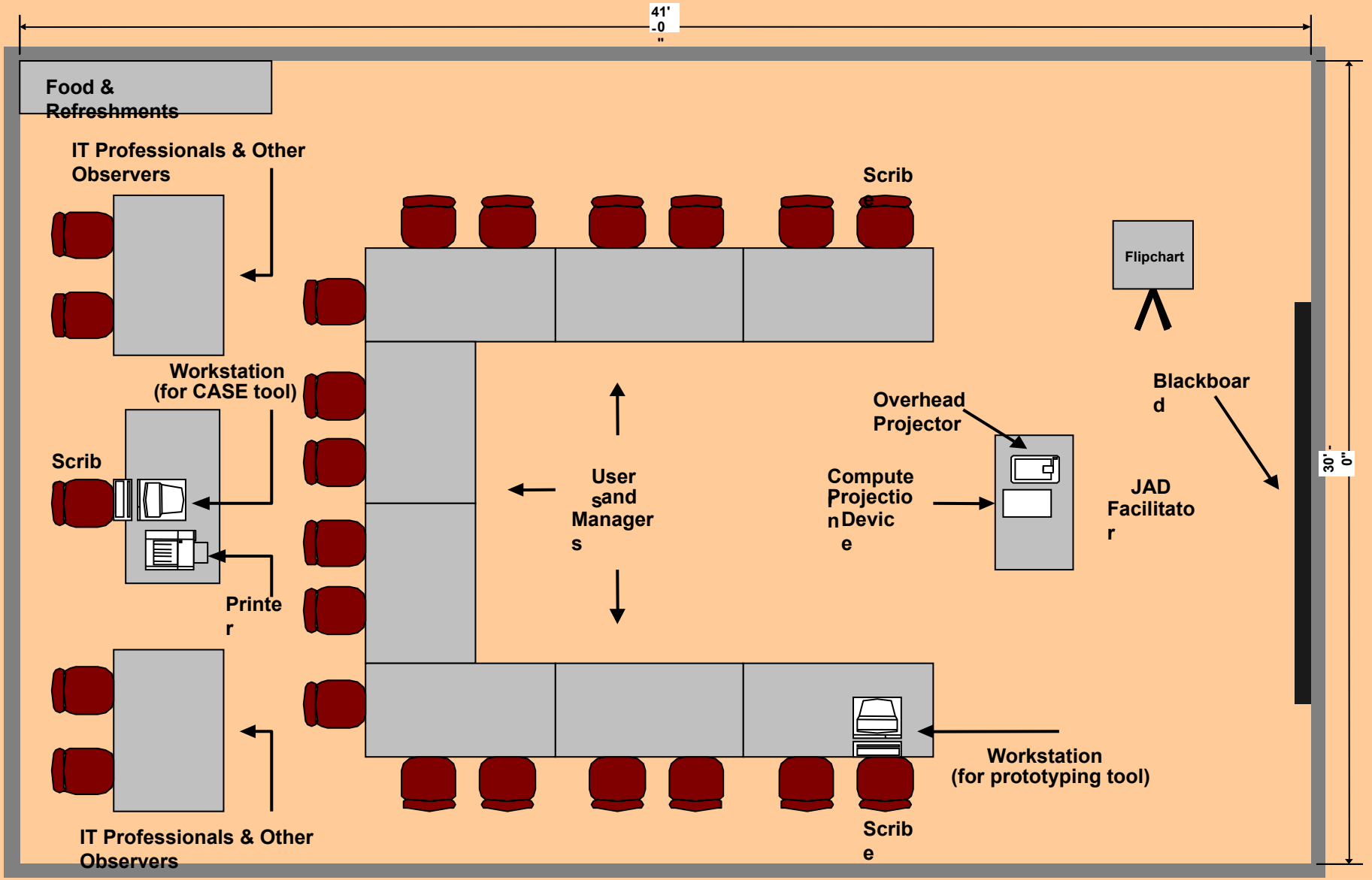
JRP Participants

- Sponsor
- Facilitator
- Users and Managers
- Scribes
- I.T. Staff

Steps to Plan a JRP Session

1. Selecting a location
2. Selecting the participants
3. Preparing the agenda

Typical room layout for JRP 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

Brainstorming 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 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

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