SYSTEM ANALYSIS AND DESIGN
BCA-308

UNIT-3

Data and fact gathering techniques: Interviews, Group Communication -Questionnaires; Assessing Project Feasibility: Technical, Operational, Economic and Cost Benefits Analysis.
Modern Methods for determining system requirements:
Joint Application Development Program, Prototyping, Business Process Re-engineering.
System Selection Plan and Proposal.

LECTURE 7 – INFORMATION GATHERING METHODS

· Interviews
· Questionnaires
· Types of Questions
· Joint Application Design (JAD)
· Observation
· STROBE

Software Project Management   Maria Petridou

INTERVIEWS

- It is the single most important investigation method.
- Traditional information gathering method used to seek facts, opinions, feelings, informal procedures, goals, etc.
- Most analyst time and effort.
- May be a *formal* in that it has been carefully planned, but *informal* in that it there should be the atmosphere of a chat.
- Needs preparation: The more preparation done in advance, the more time can be given to the user in the interview.
- A poorly-prepared interviewer will quickly lose respect!

INTERVIEWS

- Guidelines for conducting interviews:
  - Needs preparation: The more preparation done in advance, the more time can be given to the user in the interview.
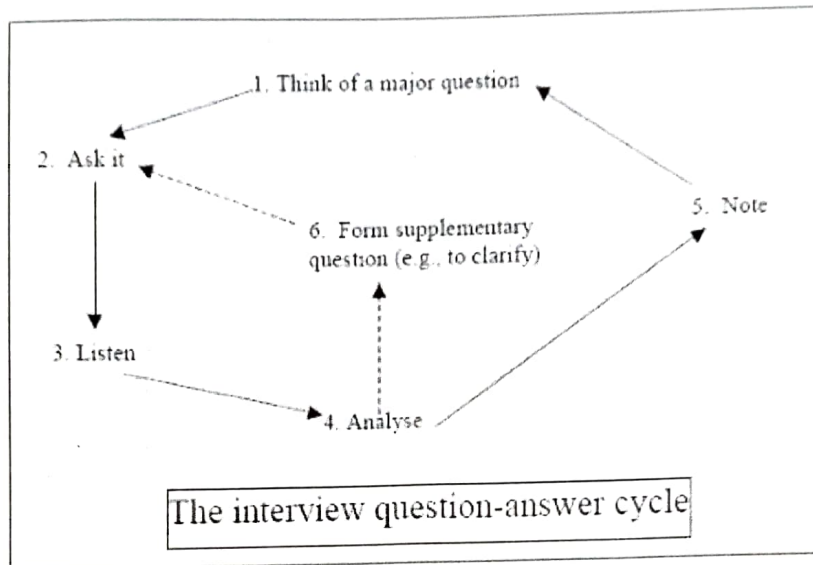 - A poorly-prepared interviewer will quickly lose respect!
  - Read background materials.
  - Interview people at different levels in the organisation.
  - Needs checklist to determine *what* info is needed.
  - Need interview guide – to control the interview to ensure all points are covered. It's the route of *how* to obtain info needed.
  - Choose types of questions (open-ended, close, probes)
  - Decide the structure of interview (pyramid, funnel, diamond)

INTERVIEWS

1. Think of a major question
2. Ask it
3. Listen
4. Analyse
5. Note
6. Form supplementary question (e.g., to clarify)

The interview question-answer cycle

INTERVIEWS

Interview Guides - Do's and Don'ts

Do:	Don'ts:
1. Keep phrasing simple	1. Be vague in phrasing
2. Keep a logical sequence	2. Cram for space or be untidy
3. Leave room for notes	
4. Keep questions relevant to the man being interviewed	
5. Have back-up checklists for documents, files, and procedures, and a simple referencing for their use	

INTERVIEWS

Interview Structure

○ <u>Pyramid Structure:</u> For inductive questioning and useful when interviewee needs to warm up. From specific to general questions.

○ <u>Funnel Structure:</u> For deductive questioning and useful to help interviewee to relax and express more freely. From general to specific questions.

○ <u>Diamond Structure:</u> Combines the strengths of both pyramid and funnel structures but is more time consuming.

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QUESTIONNAIRES

○ Important fact finding technique, but irregularly used.

○ It is a traditional gathering method used to conduct surveys.

○ May be used to quantify info found in earlier interviews.

○ A desirable way to gather large amounts of data about current system and future system.

○ Requires large amount of planning.

○ Need to find out what you wish to find out...is a questionnaire necessarily the best way of doing it?

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QUESTIONNAIRES

o Consider Questionnaires IF:

1. The people you need to question are widely dispersed.

2. There are a large number of people involved in a systems project and it is desirable to know what proportion of a given group approve/disapprove of particular features of proposed system.

3. You want to carry out an exploratory study and wish to measure opinion before any direction is set on the systems project.

QUESTIONNAIRES

o Guidelines for conducting questionnaires:

- Use them in conjunction with interviews
- Use them when the target information sources are widely dispersed
- Plan carefully the questions!
- Group questions into logically coherent sections
- Place important and less controversial questions first.
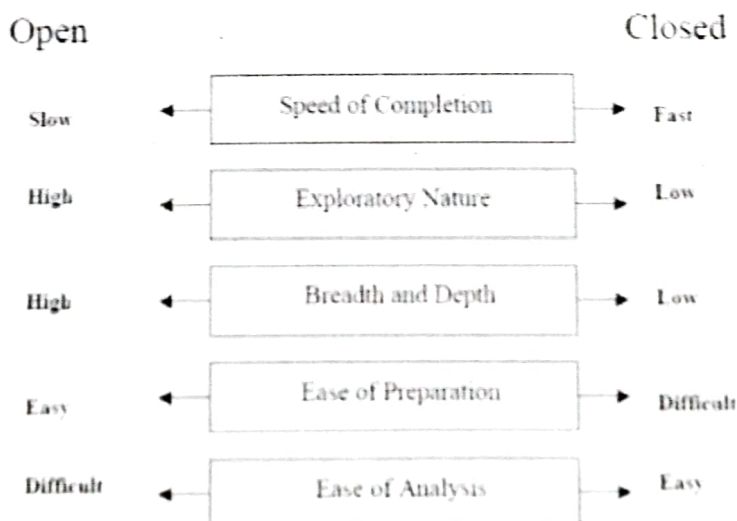- Pre-test the questionnaire to identify confusing questions

TYPES OF QUESTIONS

In general there are 2 types of questions: open-ended and closed.

o Open-ended: Those that leave all possible response to the respondent. E.g. *"Describe any problems you are experiencing..."*

o Closed: Those that limit or close the response options to the respondent. E.g. *"Below are listed five software packages. Please tick the package you use most frequently".*

  - Bipolar questions are a special type of closed questions in which the answer is limited to two choices: true/false, agree/disagree, yes/no, etc.

o Probe questions are follow-up questions (why?, give example, illustrate, etc.) aimed at gathering even further information.

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TYPES OF QUESTIONS

o Tradeoffs between open and closed questions.

Open		Closed
Slow	Speed of Completion	Fast
High	Exploratory Nature	Low
High	Breadth and Depth	Low
Easy	Ease of Preparation	Difficult
Difficult	Ease of Analysis	Easy

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TYPES OF QUESTIONS

o *Benefits* of open-ended questions:
- Helps interviewee to relax and express more freely
- Reveals avenues for further questioning
- More interesting for the interviewee
- Provides more details

o *Drawbacks* of open-ended questions:
- Too much details might be given in answer
- Potential for loosing control of interview
- Interviewer may seem unprepared
- Interviewee not prepared or not willing to give details
- Too much time in comparison to information gathered

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TYPES OF QUESTIONS

o *Benefits* of closed questions:
- Saves interview time
- Easy to analyse results
- Straight to gathering information
- Helps maintaining control of interview

o *Drawbacks* of closed questions:
- Potentially boring
- Not much details obtained (limited)
- Don't help the interviewee to relax

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JOINT APPLICATION DEVELOPMENT (JAD)

- JAD was developed by IBM.
- It is a method that focuses on development _jointly_ with the users in a group setting.
- This technique seeks to encourage collaboration and team work.
- It consists of a workshop where knowledge workers and IT specialists meet, to define and review the business requirements for the system.
- Encourage use of creative thinking techniques to produce ideas outside of box!

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JOINT APPLICATION DEVELOPMENT (JAD)

- Held away from regular place of work – minimal distractions.
- Flip charts, whiteboards, post-it notes, group support systems.
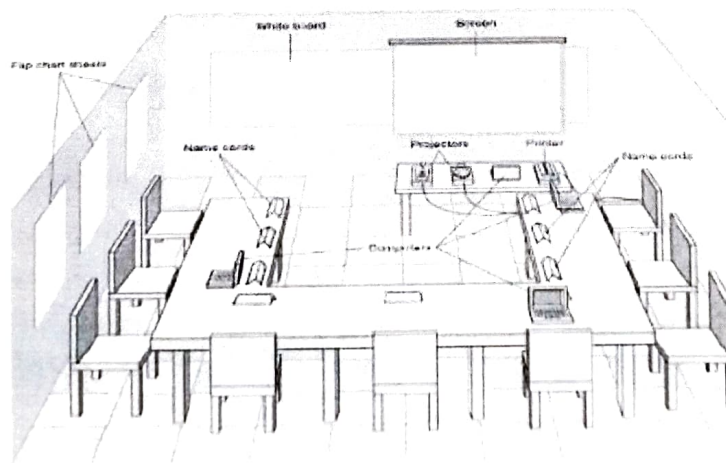
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JOINT APPLICATION DEVELOPMENT

○ Guidelines for conducting JAD:

- Only when there is support for team problem solving in the organisation.
- Should involve analyst, users, executive, technicians, etc.
- Requires commitment and leadership.
- Good communication skills and a note taker are essential.
- Audio visual equipment should be available.
- Good scheduling and agenda-driven.

JOINT APPLICATION DEVELOPMENT

○ *Benefits* of JAD:

- Saves time.
- Synergy of ideas.
- Development is faster.
- Improvement of ownership.

○ *Drawbacks* of JAD:

- Requires careful preparation.
- Requires commitment, involvement and time.
- Participative approach in organisation is key to success of approach. Otherwise, attendees will feel that their presence is simply ritualistic.

OBSERVATION

- "A picture is worth a thousand words" is also true with systems analysis.

- More than any other activity, observing the business processes in action will help in the better understanding of business functions.

- It is an information gathering method that seeks to find out what is actually done in order to contrast it with what is documented.

- It also helps to examine relationships between people in the organization.

- Understand the fundamental business needs.

- Be able to visualise the new system, while observing existing processes.

- Very famous method is STROBE.

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STROBE

- STRuctured Observation of the Environment.

- Allows analyst to observe particulars of surroundings to confirm/declare what has been found elsewhere.

- Analyst observes seven concrete elements:
  1. Office Location
  2. Desk Placement
  3. Stationary Equipment
  4. Props (properties)
  5. External Information Sources
  6. Office Lighting and Colour
  7. Clothing

Reading: (Dennis&Wixom, chapter 4 & Kendal&Kendal, chapters 4-5).

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WHAT IS A COST-BENEFIT ANALYSIS?

A cost-benefit analysis is the process of comparing the projected or estimated costs and benefits (or opportunities) associated with a project decision to determine whether it makes sense from a business perspective.

Generally speaking, cost-benefit analysis involves tallying up all costs of a project or decision and subtracting that amount from the total projected benefits of the project or decision. (Sometimes, this value is represented as a ratio.)

If the projected benefits outweigh the costs, you could argue that the decision is a good one to make. If, on the other hand, the costs outweigh the benefits, then a company may want to rethink the decision or project.

There are enormous economic benefits to running these kinds of analyses before making significant organizational decisions. By doing analyses, you can parse out critical information, such as your organization's value chain or a project's ROI.

Cost-benefit analysis is a form of data-driven decision-making most often utilized in business, both at established companies and startups. The basic principles and framework can be applied to virtually any decision-making process, whether business-related or otherwise.

Related: 5 Business Analytics Skills for Professionals

STEPS OF A COST-BENEFIT ANALYSIS

1. Establish a Framework for Your Analysis

For your analysis to be as accurate as possible, you must first establish the framework within which you're conducting it. What, exactly, this framework looks like will depend on the specifics of your organization.

Identify the goals and objectives you're trying to address with the proposal. What do you need to accomplish to consider the endeavor a success? This can help you identify and understand your costs and benefits, and will be critical in interpreting the results of your analysis.

Similarly, decide what metric you'll be using to measure and compare the benefits and costs. To accurately compare the two, both your costs and benefits should be measured in the same "common currency." This doesn't need to be an actual currency, but it does frequently involve assigning a dollar amount to each potential cost and benefit.

2. Identify Your Costs and Benefits

Your next step is to sit down and compile two separate lists: One of all of the projected costs, and the other of the expected benefits of the proposed project or action.

When tallying costs, you'll likely begin with direct costs, which include expenses directly related to the production or development of a product or service (or the implementation of a project or business decision). Labor costs, manufacturing costs, materials costs, and inventory costs are all examples of direct costs.

But it's also important to go beyond the obvious. There are a few additional costs you must account for:

- Indirect costs: These are typically fixed expenses, such as utilities and rent, that contribute to the overhead of conducting business.
- Intangible costs: These are any current and future costs that are difficult to measure and quantify. Examples may include decreases in productivity levels while a new business process is rolled out, or reduced customer satisfaction after a change in customer service processes that leads to fewer repeat buys.
- Opportunity costs: This refers to lost benefits, or opportunities, that arise when a business pursues one product or strategy over another.

Once those individual costs are identified, it's equally important to understand the possible benefits of the proposed decision or project. Some of those benefits include:

- Direct: Increased revenue and sales generated from a new product
- Indirect: Increased customer interest in your business or brand
- Intangible: Improved employee morale
- Competitive: Being a first-mover within an industry or vertical

3. Assign a Dollar Amount or Value to Each Cost and Benefit

Once you've compiled exhaustive lists of all costs and benefits, you must establish the appropriate monetary units by assigning a dollar amount to each one. If you don't give all the costs and benefits a value, then it will be difficult to compare them accurately.

Direct costs and benefits will be the easiest to assign a dollar amount to. Indirect and intangible costs and benefits, on the other hand, can be challenging to quantify. That does not mean you shouldn't try, though; there are many software options and methodologies available for assigning these less-than-obvious values.

4. Tally the Total Value of Benefits and Costs and Compare

Once every cost and benefit has a dollar amount next to it, you can tally up each list and compare the two.

If total benefits outnumber total costs, then there is a business case for you to proceed with the project or decision. If total costs outnumber total benefits, then you may want to reconsider the proposal.

Beyond simply looking at how the total costs and benefits compare, you should also return to the framework established in step one. Does the analysis show you reaching the goals you've identified as markers for success, or does it show you falling short?

If the costs outweigh the benefits, ask yourself if there are alternatives to the proposal you haven't considered. Additionally, you may be able to identify cost reductions that will allow you to reach your goals more affordably while still being effective.

Related: Finance vs. Accounting: What's the Difference?

PROS AND CONS OF COST-BENEFIT ANALYSIS

There are many positive reasons a business or organization might choose to leverage cost-benefit analysis as a part of their decision-making process. There are also several potential disadvantages and limitations that should be considered before relying entirely on a cost-benefit analysis.

Advantages of Cost-Benefit Analysis

A Data-Driven Approach

Cost-benefit analysis allows an individual or organization to evaluate a decision or potential project free of biases. As such, it offers an agnostic and evidence-based evaluation of your options, which can help your business become more data-driven and logical.

Makes Decisions Simpler

Business decisions are often complex by nature. By reducing a decision to costs versus benefits, the cost-benefit analysis can make this dilemma less complex.

Uncovers Hidden Costs and Benefits

Cost-benefit analysis forces you to outline every potential cost and benefit associated with a project, which can uncover less-than-obvious factors like indirect or Intangible costs.

Limitations of Cost-Benefit Analysis

Difficult to Predict All Variables

While cost-benefit analysis can help you outline the projected costs and benefits associated with a business decision, it's challenging to predict all the factors that may impact the outcome. Changes in market demand, material costs, and the global business environment are unpredictable—especially in the long term.

Incorrect Data Can Skew Results

If you're relying on incomplete or inaccurate data to finish your cost-benefit analysis, the results of the analysis will follow suit.

Better Suited to Short- and Mid-Length Projects

For projects or business decisions that involve longer timeframes, cost-benefit analysis has a greater potential of missing the mark for several reasons. For one, it's typically more difficult to make accurate predictions the further into the future you go. It's also possible that long-term forecasts won't accurately account for variables such as inflation, which can impact the overall accuracy of the analysis.

Removes the Human Element

While a desire to make a profit drives most companies, there are other, non-monetary reasons an organization might decide to pursue a project or decision. In these cases, it can be difficult to reconcile moral or "human" perspectives with the business case.

In the end, cost-benefit analysis shouldn't be the only business analytics tool or strategy you use in determining how to move your organization into the future. Cost-benefit analysis isn't the only type of economic analysis you can do to assess your business's economic state, but a single option at your disposal.

Business Process Re-engineering:

Business Process Reengineering (BPR) involves the radical redesign of core business processes to achieve dramatic improvements in productivity, cycle times, and quality. In Business Process Re-engineering, companies start with a blank sheet of paper and rethink existing processes to deliver more value to the customer. They typically adopt a new value system that places increased emphasis on customer needs. Companies reduce organizational layers and eliminate unproductive activities in two key areas. First, they redesign functional organizations into cross-functional teams. Second, they use technology to improve data dissemination and decision-making.
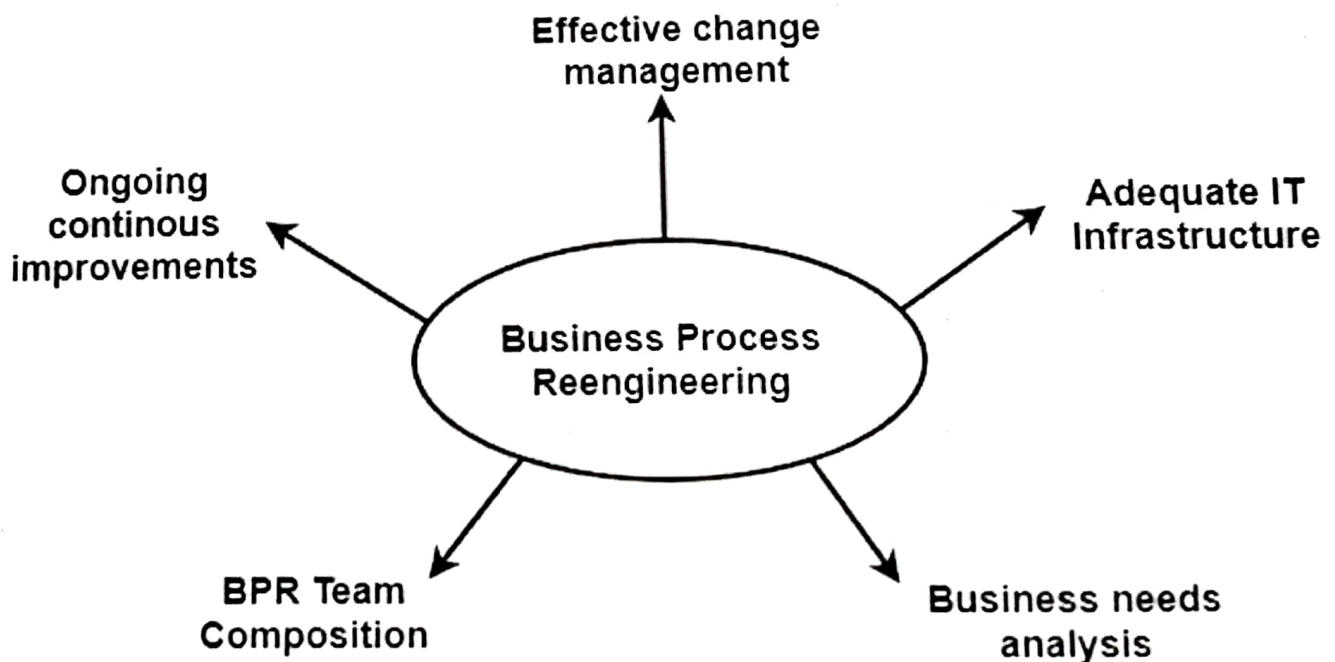
Business Process Reengineering is a dramatic change initiative that contains five (5) major steps. Managers should:

1. Refocus company values on customer needs
2. Redesign core processes, often using information technology to enable improvements
3. Reorganize a business into cross-functional teams with end-to-end responsibility for a process
4. Rethink basic organizational and people issues
5. Improve business processes across the organization

Companies use Business Process re-engineering to improve performance substantially on key processes that impact customers. Business Process Reengineering can:

Advertisements

- Reduce costs and cycle time: Business Process Reengineering reduces costs and cycle times by eliminating unproductive activities and the employees who perform them. Reorganization by teams decreases the need for management layers, accelerates information flows, and eliminates the errors and rework caused by multiple handoffs.
- Improve quality: Business Process re-engineering improves quality by reducing the fragmentation of work and establishing clear ownership of processes. Workers gain responsibility for their output and can measure their performance based on prompt feedback.

System selection means selecting the various hardware, software, and services that are needed for implanting the system. Before the system selection can be done, it is necessary to know the capabilities of required proposed system . The volumes to be processed need to be know. The level of Competence of the staff should be assessed. It should include the current requirements and what is required to expand the system.

For example one may need to have more storage if the volume of transactions goes up. Considerations like compatibility and interfacing should be clearly stated. Upgradability should also specified-such as a new process.

After the system requirements are understood, specification for the systems to be acquired and prepared. These are used to prepare a **Request for proposal** . The RFP is sent to the vendor from the vendor database or is used to advertise for bids from vendors. The RFP should clearly contain:

- Complete system specification.
- Related price, term, time frame for delivery, etc.
- Requirements of training from other services from vendor for any of these to be specific as a part of the bid, or an enquiry to know the availability and prices.
- Warranties and Contractual limitations.
- Service agreements and penalty clauses if any.
- Vendor information required such as
- Reference sites
- Location of service centers and strength of service staff
- Financial service of vendor

The Role of prototyping in Analysis

Prototyping is a means that is being increasingly used to gather the requirement specifications from users. This is found useful in a number of situations, like:

- Where the user is unable to articulate the requirements.
- User cannot visualize the systems he wants, specially new users who have no idea of what a system could look like.
- When the environment is new and not fully understood by the users or analyst.
- Where the requirements are expected to evolve. For example, a decision support system, where the users wants to have an idea of what the system can do come up with more requirements.
- Where the uncertainty is high.