Large Scale Systems Design
G52LSS

Lecture 11 – Information Gathering Methods

- Interactive Methods
- Non-obtrusive Methods
- Types of Questions
- Comparing Gathering Methods

**Learning outcomes:** describe the different information gathering methods; understand the benefits and drawbacks of each method; recognise types of questions; identify good practices when using information gathering methods.

<table>
<thead>
<tr>
<th>Types of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-ended questions</td>
</tr>
<tr>
<td>Closed questions</td>
</tr>
<tr>
<td>Bipolar questions</td>
</tr>
<tr>
<td>Probe questions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open-ended</th>
<th>Criteria</th>
<th>Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>reliability of data</td>
<td>High</td>
</tr>
<tr>
<td>Low</td>
<td>efficient use of time</td>
<td>High</td>
</tr>
<tr>
<td>Low</td>
<td>precision of data</td>
<td>High</td>
</tr>
<tr>
<td>Much</td>
<td>breath and depth</td>
<td>Little</td>
</tr>
<tr>
<td>Much</td>
<td>skills/preparation needed</td>
<td>Little</td>
</tr>
<tr>
<td>Difficult</td>
<td>easy analysis of data</td>
<td>Easy</td>
</tr>
<tr>
<td>High</td>
<td>facilitate communication</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Interactive Techniques**

- Interviews
  - Select
  - Design
  - Prepare
  - Conduct
  - Follow up

- Questionnaires
  - Select
  - Design
  - Conduct
  - Follow up

- Joint application development (JAD)
  - Select
  - Design
  - Prepare
  - Conduct
  - Follow up

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

**Drawbacks of open-ended questions:**
- Too much details might be given in answer
- Potential for losing control of interview
- Too much time in comparison to information gathered
- Interviewee not prepared or not willing to give details
- Interviewer may seem unprepared
Benefits of closed questions:
- Saves interview time
- Easy to analyse results
- Straight for gathering information
- Helps maintaining control of interview
- More relevant and more breadth of scope

Drawbacks of closed questions:
- Potentially boring
- Not much details obtained (limited)
- Do not help the interviewee to relax

Interviews
Traditional information gathering method used to seek facts, opinions, feelings, informal procedures, goals, etc.

Guidelines for conducting interviews:
- Interviewer should know himself
- Prepare the interview carefully
- Read background material
- Establish interview objectives
- Interview people at different levels in the organisation
- Prepare the interviewee
- Choose types of questions carefully
- Decide on the structure of interview
- Write and review the interview report as soon as possible

Exercise 11.1 Here there are five questions written by one of your systems analysis team members. The interviewee is the local manager of LOWCO, an outlet of a national discount chain, who has asked you to work on a management information system to provide inventory information.
1. When was the last time you thought seriously about your decision-making process?
2. Who are the trouble makers in your store, I mean the ones who will show the most resistance to changes in the system that I have proposed?
3. Are there any decisions you need more information about to make them?
4. You don’t have any major problems with the current inventory control system, do you?
5. Tell me a little about the output you’d like to see

Exercise 11.1 (cont.) Review these questions for your team member. If appropriate, rewrite each question to be more effective in eliciting information.
Types of Interview Structures

**Pyramid Structure.** For inductive questioning and useful when interviewee needs to warm up. From specific to general questions.

**Funnel Structure.** For deductive questioning and useful to help interviewee to relax and express more freely. From general to specific questions.

**Diamond Structure.** Combines the strengths of both pyramid and funnel structures but is more time consuming.

---

Exercise 11.2 Determine the structure of the following interview. From (Kendall and Kendall 2005, chapter 4).

1. How long have you been in this position?
2. What are your key responsibilities?
3. What reports do you receive?
4. How do you view the goals of your department?
5. How would you describe your decision making process?
6. How can that process best be supported?
7. How frequently do you make those decisions?
8. Who is consulted when you make a decision?
9. What is the one decision you make that is essential to departmental functioning?
10. Do you use the web to provide information to vendors?
11. Is this form complete?
12. What makes you feel that way?

---

**Questionnaires**

Traditional information gathering method used to conduct surveys. Useful for exploratory studies and for aiding other information gathering methods.

**Guidelines for using questionnaires:**
- Use in conjunction with interviews
- Use when target information sources are widely dispersed
- Plan and write clear questions of different types
- Design adequate scales for answers to closed question
- Scales can be nominal or interval and designed to ensure information gathered is valid and reliable
- Allow ample white space and ample answering space. Be consistent in style and format in the whole questionnaire
- Place important and less controversial questions first
- Group questions into logically coherent sections
- Pretest the questionnaire to identify confusing questions

---

Exercise 11.3 Systematically critique the questionnaire below. Form (Kendall and Kendall 2005, chapter 4).

**Figure 4.2** Questionnaire developed for managers of Global Health spa by Tenexx Court.

- What is the biggest problem you have when communicating your information requirement to healthcare providers? Briefly.
- How much overlap did you experience last year? 0, 1, 2, 3, 4, 5, 6, 7.
- What computer equipment you own now?
- Does your e-mail box ever overflow?
- Do you have an area of expertise?
Exercise 11.3 (cont.)

JAD (Joint Application Development)
Method that focuses on development jointly with the users in a group setting. This technique seeks to encourage collaboration and teamwork.

Guidelines for implementing JAD:
- Only when there is support for team problem solving in the organisation
- Should involve analyst, users, executive, technicians, operative staff, etc.
- Requires commitment and leadership
- Systems analyst participates in a more passive role
- Good communication skills and a note taker are essential
- Conduct in comfortable installations
- Audio visual equipment should be available
- Good scheduling and agenda-driven

Benefits of JAD:
- Saves information gathering time
- Development is faster
- Improves ownership of system
- Encourages creativity in the design

Drawbacks of JAD:
- Requires commitment, involvement and time
- Preparation of follow-up reports should be complete
- Requires well developed organisational skills and structure
**Non-obtrusive Techniques**

Non-obtrusive techniques:
- Sampling
  - select representative elements to reveal useful information
- Observation
  - useful to validate gathered information
- Document analysis (investigation)
  - track and analyse functioning of the current system

**Sampling**

Process of systematically selecting representative elements of a population in order to examine them closely so that the analysis reveals useful information about the population as a whole.

Guidelines for using sampling:
- Determine the data to be collected or described
- Determine the population to be sampled
- Choose the type of sample (convenience, purposive, simple random, complex random)
- Decide on the sample size, for example see the method in (Kendall and Kendall 2005, page 126)

**Observation**

Method that seeks to find out what is actually done in order to contrast it with what is documented. This method also helps to examine relationships between people in the organisation. Observation can be done on: 1) decision-makers, 2) the physical environment.

The observation method **STROBE** focuses on observing seven elements:
- office location
- desk placement
- stationary and office equipment
- properties
- external information sources
- office lighting and colour
- clothing

**Example 11.1** For the following narrative, the interpretation of some elements of STROBE is illustrated.

“We’re a progressive company, always looking to be ahead of the power curve. We’ll give anything a whirl if it’ll put us ahead of the competition, and that includes every one of us,” says I. B. Daring, an executive with Michigan Manufacturing (2M). You are interviewing him as a preliminary step in a systems project, one in which his subordinates have expressed interest. As you listen to I. B., you look around his office to see that most of the information he has stored on shelves can be classified as internal procedures manuals. In addition, you notice a PC on a back table of I. B.’s office. The monitor’s screen is covered with dust, and the manuals stacked beside the PC are still encased in their original shrink-wrap. Even though you know that 2M uses an intranet, no cables are visible going to or from I. B.’s PC. You look up behind I. B.’s massive mahogany desk to see on the wall five framed oil portraits of 2M’s founders, all clustered around a gold plaque bearing the corporate slogan, which states, “Make sure you’re right, then go ahead.”
Example 11.1 (cont.)

- **Desk placement**: the massive desk maximizes territory suggesting that there is a desire for power and authority.
- **Stationary office equipment**: the information stored on shelves can be classified as internal procedure manuals, suggesting that Daring is focused on the internal organisation rather than the external environment.
- **Properties**: the unused PC equipment suggests that Daring is not as daring and progressive as he portrays. The portraits and message on the plaque reinforce the stodgy philosophy.
- **Lighting and colour**: the dark mahogany desk and the gold plaque suggest a conservative approach.

Document Analysis (investigation)
Method that **focuses on examining formal and informal documents used in the organisation** in order to understand existing processes and policies as well as to identify current practices. Document analysis can be carried out on **quantitative documents or qualitative documents**.

<table>
<thead>
<tr>
<th>Quantitative Documents</th>
<th>Qualitative Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Reports of decision-making</td>
<td>- Emails</td>
</tr>
<tr>
<td>- Performance reports</td>
<td>- Memorandums</td>
</tr>
<tr>
<td>- Records</td>
<td>- Organisation's web pages</td>
</tr>
<tr>
<td>- Data capture forms</td>
<td>- Process manuals</td>
</tr>
<tr>
<td></td>
<td>- Policy handbooks</td>
</tr>
</tbody>
</table>

Comparing Gathering Methods
Each information gathering technique has **strengths and weaknesses** with respect to the following criteria:

- Type of information
- Depth of information
- Breath of information
- Integration of information
- User involvement
- Incurred cost
<table>
<thead>
<tr>
<th>Type of information</th>
<th>Sampling</th>
<th>Observation</th>
<th>Document Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present Improvements Future</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Depth of information</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Breadth of information</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Integration of information</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>User involvement</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Incurred costs</td>
<td>Low-Medium</td>
<td>Low-Medium</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Additional Reading**

Chapter 4 of (Dennis et al., 2006)

Chapters 4,5 of (Kendall and Kendall, 2005)