Alternative Data Gathering Approaches

Lecture Objectives

- To understand:
  - the purpose of the analysis phase
  - to understand various traditional data gathering methods and issues

Analysis - Purpose

Systems analysis is driven by business concerns, specifically, those of system users. Its purpose is
- to study and analyse the
  - problems and/or opportunities in the existing systems
  - reasoning behind directives
- to define and prioritise the business requirements so that:
  - problems are addressed, opportunities are exploited and directives are fulfilled
Analysis Phase – Purpose

• The analysis phase provides the analyst with a more thorough understanding of problems, opportunities, and/or directives...data is gathered and models are created to help this understanding
• It answers the questions:
  • Are the problems really worth solving?
  • Is a new system really worth building

During Analysis an Analyst should ...

• Question everything
• Listen effectively
• Be impartial ... consider all sides
• Assume anything is possible .. then apply constraints
• Pay attention to detail
  • all bits must fit together
• Be creative .. look at things in new ways
• Be aware of body language

Logical Design

• Remember that we are here to
  • work out what the user needs and wants from the new system
  • NOT ... to look at alternative computer solutions
• Systems will only be deemed successful if they fulfill the users’ business requirements ...
  • the technology is a definite second

WHAT not HOW

• Known as a LOGICAL design.
Review and present requirements specifications

- Conduct a QUALITY REVIEW to ensure that
  - the relevant activities were completed correctly
  - the documentation meets standards
- Present findings
- Get necessary approval to continue or adjust or cancel the project

Data gathering: Questionnaires

- A structured method of data gathering in which written questions/comments are provided for the participants to respond to in written form
- Usually involves no direct contact between data gatherer and data provider (cf. interview)

Questionnaires

- Useful for:
  - Obtaining simple opinions, facts
  - Quantifying what was found in interviews
  - Identifying issues before interviewing
  - Determining extent of problems
- Useful when
  - small amounts of data are required from a large number of people
  - For geographically dispersed respondents
Questionnaires

- Not useful for detailed
- Not useful for complex information
- Not useful for exploring issues in depth
- Sometimes feel impersonal/ mass produced

- Can supplement other methods

Designing questionnaires

- What facts and opinions to be collected
- Who to sample and sample size
- Types of questions and wording (precise, accurate, unambiguous)
  - Open-ended (free format)
  - Fill-in-the-blank
  - Multiple choice
  - Rating
  - Ranking

Designing questionnaires (2)

- How to administer e.g. paper, online, mail out etc.
- Format and layout (grouping, crosschecks etc.)
- Test on small sample of respondents
- How completed questionnaires will be returned and collated
- How analysis of the data will be carried out
Questionnaires: Advantages

- most economical method for gathering data from large numbers of people
- fast and easy to implement and administer
  - minimal logistical problems
- results can be tabulated rapidly and analysed readily
- allow respondents to be anonymous, therefore more likely to be truthful
- gives respondents time to reflect on answers

Questionnaires: Disadvantages

- effective questionnaires are very difficult to construct
- they produce only specific and limited amounts of information
- provide no opportunity to clarify vague or incomplete answers
- lack non-verbal communication

Observation

- observing the actual processes of a system
- need to prepare beforehand, and report on data collected
- gain first hand knowledge of current system’s operations
- clarify other information collected
- understand complex procedures
- inexpensive
Observation: Advantages

- the analyst can see exactly how the work is done (what you see is what you get); information gathered in other ways can be checked or confirmed
- allows vivid illustration of processes in a way which no other data gathering method can emulate – (action speaks louder than words)
- requires no direct input from participants and is therefore usually cheap and easy to arrange
- enables precise measurement of aspects of work (e.g. how long does it take to process an order?)

Observation: Disadvantages

- can only show what is done now and how it is done now
- time-dependence of some tasks can give misleading ideas about some aspects of the system (e.g. observe traffic at peak hour vs. observe at midnight)
- tends to emphasise physical work flows at the expense of other forms of information (e.g. the nature of the processes can be hidden behind physical activity)
- can introduce ‘Hawthorne effect’ biases in which people behave differently when observed to the way they would behave normally

Reports and System Documentation

- existing written records which are a valuable source of data about the system and the organisation
- may include informal material used by people involved with the system
### System Documentation

May include information about:

- the organisation – annual reports, advertising brochures
- its people and policies – organizational structure charts, procedures manuals
- overall business functions and objectives – policy statements, minutes of meetings
- the system – forms (invoice form, order form, stock card, training manuals, etc)
- the technical environment – system manuals, specifications

### Sampling of Documents and Transactions

- Sampling: collecting a representative sample of documents, forms, transactions
- Useful for specific information e.g. transaction volumes and types, file sizes
- Useful where large volumes exist
- Information about existing system operations
- Representative samples must be selected: determine sample size, appropriate range, avoid bias

### Reports and Documentation: Advantages

- its existence and authorship cannot be challenged
- it may provide very detailed and precise information (especially with complex or technical material)
- it may provide valuable background material to an interview or observation session
Reports and Documentation: Disadvantages

- It will almost certainly be old
- Possibly out of date
- It is subject to interpretation and does not permit further explanation or clarification
- It tends to focus on particular aspects of the system, rather than giving the 'big picture'

Research and site visits

- Most problems not unique: learn from experiences of other organisations
- Professional societies can provide contacts for site visits
- Computer trade journals and magazines and the internet can be sources for research into the problem/s e.g. do appropriate software packages exist?

Other data gathering methods

Other “modern” methods used:

- JAD (Joint Application Development) sessions
- Focus groups
- Agile Methods – no design!
A data gathering strategy

- Data gathering must be carefully planned in order to make the most of the time and resources available:
  - Information sources
  - Data gathering methods
  - Recording and documentation methods
  - Data analysis methods
  - Procedures for reviewing results with management and users

- E.g. a “top down” approach:
  - Initial interviews with management to determine major system activities and data
  - Document and verify this
  - Expand major system component descriptions into detailed descriptions:
    - Interview operational users, sampling, questionnaires, observation etc
  - Document and verify this
  - Repeat these last two steps as necessary
  - Review findings with management

- Consider costs: allow for time and resources required for initial and ongoing information gathering
- Use the least expensive methods first
- Plan how to check the validity of data:
  - Cross checking between groups, methods
  - Evaluate data for inconsistencies
  - Ask further questions
- Plan documentation of data e.g. records of interviews etc. data dictionary, system models
Data gathering in practice

- Completeness?
- Accuracy?
- Objectivity?
- Biases?
- Stability?
- Representative?
- Finished?

Data Gathering: Completeness

Completeness
- it is impossible to discuss all aspects of the system with all those involved ... ensure that the sample size is adequate to represent all points of view adequately

Data Gathering: Objectivity

Accuracy/objectivity/consistency
- People’s understanding/interpretation of events will depend heavily on their perspective. It may be impossible to reconcile the views of individuals with different perspectives ... try and take account of these biases
Data Gathering: Stability

Stability
- Organisations and business and system environments change so fast that any data gathered quickly becomes out of date ... needs to be a continuous process

Data Gathering in Practice

- Gathering data is like doing a jigsaw puzzle (but you don't know what the final picture will look like!). You must be able to maintain a broad picture of all the pieces and find how they fit together

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- You must use a variety of methods to suit the specific circumstances, the sort of data you want and the sort of people you are getting it from
- Validation of key data items is essential - between groups and between data collection methods
References

  Modern Systems Analysis and Design,
  Benjamin/Cummings, Massachusetts. Chapter 6
  and Design Methods, Irwin, Burr Ridge, Illinois
  Chapter 6

References

  5th ed., Systems Analysis and Design Methods,
  Irwin/McGraw-Hill, New York, NY. Chapter 6
  Modern Systems Analysis and Design,
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