CSE1204 - Information Systems 1

**Alternative DATA GATHERING FOR INFORMATION SYSTEMS DEVELOPMENT**

**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

**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

**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

**Definition Phase - Purpose**

- 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 fulfil the users' business requirements … the technology is a definite second
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

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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
- 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 (eg 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:
- Discovery prototyping
- JAD (Joint Application Development) sessions
- Focus groups
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

A data gathering strategy (continued)

- 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

A data gathering strategy

- 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


Questionnaires: advantages

- most economical method for gathering data from large numbers of people
- quick and easy to administer
- results can be tabulated rapidly and analysed readily
- allow respondents to be anonymous
- gives respondents time to reflect on answers
- respondents complete in their own time

Questionnaires: disadvantages

- difficult to construct effective questionnaires
- specific and limited amounts of information
- possible low return rates
- possible bias and misinterpretation
- cannot probe issues further (inflexible)
- cannot clarify vague or incomplete answers
- lack non-verbal communication
References

