Information Systems Concepts

Requirements Capture

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Based on Chapter 6, 12 and 21 of Bennett, McRobb and Farmer:
Outline

- User Requirements
  - Section 6.2 (pp. 138 – 142)
  - Section 12.5.3 (pp. 360)
  - Section 21.4.2 (p. 622 – 623)

- Fact Finding Techniques
  - Section 6.3 (pp. 142 – 150)
Factors on Challenged Software Projects

- Poor user input: 13%
- Incomplete requirements: 12%
- Changing requirements: 12%
- Poor technical skills: 7%
- Poor staffing: 6%
- Other: 50%

37% of factors are related to requirements

--- C. Larman: *Applying UML and Patterns*. Prentice Hall, 2004
Need for New Systems

- Organizations operate in a rapidly changing *business* environment
- Organizations operate in a rapidly changing *technical* environment
- Governments and supra-governmental organizations (e.g., EU) may introduce *legislation*
- Information Systems become outdated
- Organizations may merge, take over and get taken over (or even simply grow and change the ways they operate)
Investigating Current System

- Some of the *functionality* will be required in the new system
- Some of the *data* must be migrated to the new system
- Technical *documentation* provides details of processing algorithms
- *Defects* of existing system must be avoided
- *Parts* of the existing system may have to be kept
- We need to understand the work of the *users*
- *Baseline* information about the existing system helps set performance targets for the new one
Current System v New System

- SSADM (Structured Systems Analysis and Design Method) makes the case for modelling the current system — much of its functionality will be required in the new system.

- Yourdon (1989) argues against spending a lot of time analysing the existing system — it’s being replaced!

Things will develop in the opposite direction when they become extreme.

The *Golden Mean* from Confucianism
Types of User Requirements

- Functional requirements
- Non-functional requirements
- Usability requirements
Functional Requirements

- What the system does or is expected to do (*functionality*)
  - include
    - descriptions of processing to be carried out
    - details of the inputs (forms, documents, etc.)
    - details of the outputs (documents, reports, screens, transfers to other systems)
    - details of data that must be held in the system
  - documented in
    - Use Case models
    - Class Diagrams, Communication or Sequence Diagrams and State Machine Diagrams
Non-functional Requirements

- How well the system provides the functional requirements
  - include
    - performance: response times / volumes of data
    - availability (downtime), concurrent access
    - security considerations
    - ...
  - documented in:
    - Requirements List
    - Use Case models (for requirements that can be linked to specific use cases)

Support for both Microsoft IE and Mozilla Firefox?
Usability Requirements

- How good the system is matched to the way that people work
  - include:
    - characteristics of users
    - tasks users undertake
    - situational factors
    - acceptance criteria for the working system
    - ...
  - documented in:
    - Requirements List (may be tested by prototypes)

Unbounded undo/redo? Pop-up free?
Measurable Objectives in Design

- How can we tell whether the non-functional requirements have been achieved?
- Measurable objectives set clear targets for designers
- Objectives should be quantified so that they can be tested
Measurable Objectives: Examples

- To reduce invoice errors by one-third within a year
  - How would you design for this?
    - checks on quantities
    - comparing invoices with previous ones for the same customer
    - better feedback to the user about the items ordered

- To process 50% more orders at peak periods
  - How would you design for this?
    - design for as many fields as possible to be filled with defaults
    - design for rapid response from database
    - design system to handle larger number of simultaneous users
Prioritizing Requirements

MoSCoW

- **Must have** requirements are crucial -- the system will not operate without them
- **Should have** requirements are important, but if necessary the system can still operate without them
- **Could have** requirements are desirable, but provide less benefit to the user
- **Won’t have** requirements should be left for a later iteration/increment

*Rocks, Gravel, Sand and Water*
Fact-Finding Techniques

- SQIRO
  - Document Sampling
  - Questionnaires
  - Interviewing
  - Background Reading
  - Observation

This is not the order they are mostly likely to be used!
Background Reading

- **aim:**
  - to understand the organization and its business objectives

- **sources of information:**
  - reports
  - organization charts
  - policy manuals
  - job descriptions
  - documentation of existing systems

- **appropriate situations:**
  - analyst is not familiar with the organization
  - initial stages of fact finding
Background Reading

- **advantages:**
  - helps to understand the organization before meeting the people who work there
  - helps to prepare for other types of fact finding
  - documentation of existing system may provide formally defined requirements for the current system

- **disadvantages:**
  - written documents may be out of date or not match the way the organization really operates
Interviewing

- **aim:**
  - to get an in-depth understanding of the organization’s objectives, users’ requirements and people’s roles

- **includes:**
  - managers to understand objectives
  - staff to understand roles and information needs
  - customers and the public as potential users

- **appropriate situations:**
  - most projects
  - at the stage in fact finding when in-depth information is required

*Interviewing guidelines (Box 6.1)*
Interviewing

- advantages:
  - personal contact allows the interviewer to respond adaptively to what is said
  - it is possible to probe in greater depth
  - if the interviewee has little or nothing to say, the interview can be terminated

- disadvantages:
  - can be time-consuming and costly
  - requires skill and sensitivity
  - notes must be written up or tapes transcribed after the interview
  - can be subject to bias
  - if interviewees provide conflicting information this can be difficult to resolve later
Observation

- aim:
  - to see what really happens, not what people say happens

- includes:
  - seeing how people carry out processes
  - seeing what happens to documents
  - obtaining quantitative data as baseline for performance improvements provided by the new system
  - following a process through end-to-end

- appropriate situations:
  - when quantitative data is required
  - to verify information from other sources
  - when conflicting information from other sources needs to be resolved
  - when a process needs to be understood from start to finish
Observation

- **advantages:**
  - first-hand experience of how the current system operates
  - high level of validity of the data can be achieved
  - verifies information from other sources and looks at exceptions
  - allows the collection of baseline data about the performance

- **disadvantages:**
  - people don’t like being observed and may behave differently, distorting the findings
  - requires training and skill
  - logistical problems for the analyst with staff who work shifts or travel long distances
  - ethical problems with personal data
Document Sampling

- **aim:**
  - to find out the information requirements that people have in the current system
  - to provide statistical data about volumes of transactions and patterns of activity

- **includes:**
  - obtaining copies of blank and completed documents
  - counting numbers of forms filled in and lines on the forms
  - screenshots of existing computer systems

- **appropriate situations:**
  - always used to understand information needs
  - where large volumes of data are processed
  - where error rates are high
# Agate

## Campaign Summary

**Date**: 23rd February 2005

**Client**: Yellow Partridge  
Park Road Workshops  
Jewellery Quarter  
Birmingham  
B2 3DT  
U.K.

**Campaign**: Spring Collection 2005

**Billing Currency**: GBP £

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<th>Curr</th>
<th>Amount</th>
<th>Rate</th>
<th>Billing Amount</th>
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<td>GBP £</td>
<td>15,000.00</td>
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<td>EUR €</td>
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<td>Placement Portuguese Vogue</td>
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This is not a VAT Invoice. A detailed VAT Invoice will be provided separately.
Document Sampling

- advantages:
  - for gathering quantitative data
  - for finding out about error rates

- disadvantages:
  - not helpful if the system is going to change dramatically
Questionnaires

- **aim:**
  - to obtain the views of a large number of people in a way that can be analysed statistically

- **includes:**
  - postal, web-based and email questionnaires
  - yes/no and multiple choice questions
  - gathering opinions (scaled questions) as well as facts

- **appropriate situations:**
  - when views of a large number of people need to be obtained
  - when staff of the organization are geographically dispersed
  - for systems that will be used by the general public and a profile of the users is required

**Questionnaire guidelines (Box 6.2)**
YES/NO Questions
Do you print reports from the existing system? YES NO 10
(Please circle the appropriate answer.)

Multiple Choice Questions
How many new clients do you obtain in a year? a) 1–10 □ 11
(Please tick one box only.) b) 11–20 □
c) 21–30 □
d) 31 + □

Scaled Questions
How satisfied are you with the response time of the stock update?
(Please circle one option.)

Open-ended Questions
What additional reports would you require from the system?

____________________________________________________
____________________________________________________
____________________________________________________
____________________________________________________
Questionnaires

- advantages:
  - economical way of gathering information from a large number of people
  - effective way of gathering information from people who are geographically dispersed
  - a well designed questionnaire can be analysed by computer

- disadvantages:
  - good questionnaires are difficult to design
  - no automatic way of following up or probing more deeply
  - postal questionnaires suffer from low response rates
Take Home Messages

- User Requirements
  - Current System v New System
  - Functional and Non-functional (usability, etc.)
  - Measurable Objectives in Design
  - MoSCoW

- Fact Finding Techniques
  - SQIRO