Topic 4

Analysis and Specification

Contents

Learning Objectives

- *Appreciation of the importance of the environment in which a system operates*
- *Awareness of the need to support clients in identifying their needs*
- *Familiarity with the ideas of system investigation and modelling*
- *Appreciation of the contents of requirements and functional specifications*
- *Awareness of the role of a requirements specification in a contract to supply*

I'll tell you what I want, what I really really want. (The Spice Girls 1996)

4.1 Determining what needs to be done

You should have read Article 5 of CKR before starting on this topic. The article details elements of the requirements specification which will have formed part of the contract between Silicon Techtronics Inc. and Cybernetics Inc. for the supply of the Robbie CX30 system.

Customers seeking new systems will invariably echo the opening lines of The Spice Girls' song "Wannabe" (quoted at the start of this topic). They know what they want, so sharpen your pencil because here it comes ... They then proceed to become about as meaningful as the "zigazig ah" on which the song ends when describing the details of their requirements. What is going on here? Surely the client has thought through their needs? So why do they seem incapable of spelling them out?

Well they are spelling them out, of course. What they are saying is perfectly intelligible to them. It just does not make sense to you, the supplier. You are going to have to learn a lot more about their business and their current practices in order to understand what they are saying and thus what they say they want. Once you have done that, you (and they) might well come to the conclusion that the system they want is not necessarily the system that they need. The client might be the expert on their business but you have the expertise regarding what is possible and what is not, what the drawbacks are to doing things one way or another way, what the future might bring. etc. and relating all of these to the client's business. Congratulations, you have become a systems analyst.

4.2 Systems analysis

You might think that systems analysis boils down to identifying the problems in a system currently being used and proposing fixes to it. Stair and Reynolds (2003) identify eight reasons for developing a new system and there are probably many more. Only one of their reasons is problems with the existing system. Other reasons include such things as a desire to exploit new opportunities, organisational growth and a need to comply with new regulations or laws. Fixing problems in an existing system is relatively straightforward compared to the other issues the systems analyst might be asked to deal with. Whatever the reasons, the first step is to carry out a thorough, but focused, system investigation.

4.2.1 System investigation

Given an initial site of investigation (identified by the client), it is clearly important to include in the analysis any activities which interact with that site. This could rapidly get out of hand and investigating the workings of a complete enterprise is rarely necessary. However, focusing in on that part of an enterprise which does need thorough analysis is no simple task. The concept of a system boundary (Licker 1987) is useful here. By assessing the dependence of the core components of a system on other activities it is

possible to decide whether each of those other activities belongs within the system boundary or to the environment surrounding the system. One of the most useful outcomes of the investigation is a system model.

4.2.2 System modelling

Modelling allows us to build up a picture of the interactions and information flows which exist within a system and between a system and its environment. Different people within an enterprise will see a given system in different ways. Licker (1987) lists seven ways in which an information system might be viewed -

1. The ”brains” of the enterprise
2. A decision support system
3. A communication channel
4. A data bank
5. A data transporter
6. A hardware system
7. An appendage to the business

The models which could be produced from these differing perspectives of a system are likely to be quite different. It is important speak to the right people when carrying out the system investigation in order to ensure that the appropriate type of model is built. Note that the managers of systems do not always see things in the same way as staff working with or within systems. Whose view should be used to build the model? It might be that more than one model is necessary to capture the various functions which a system performs.

4.3 Requirements specification

Once a proper understanding of the current system has been obtained, and models of it built, the analyst has sufficient information to discuss the client’s requirements. The models created by systems analysts are sometimes real eye-openers to their clients. For instance, it might only be because two people happened to take tea with each other every day that a certain information flow, crucial to the business, was possible. Together, the analyst and the client can identify weak points such as this in current practices, prepare for future changes which are likely to affect a system or completely re-engineer an antiquated system which is past its sell-by date.

If a current system is to be modified the consequences of the modifications need to be clearly understood by both the developer and the client. If a new system is to be introduced it must integrate smoothly with any other systems already in place and its introduction must be planned properly. Development and installation time-scales must be agreed and training of staff to use the new or modified system arranged. Matters such as these should all figure in a requirements specification, in addition to the functional specification of the system.

4.3.1 Functional specification

The functional specification states what the system will do. It specifies all of the functions that the system is required to perform. The level of detail at which this specification takes place is likely to vary for different parts of the system. For some items of functionality it might be crucial that the function be performed in a particular way and this should be stated in great detail. For some items, the interaction with other systems or users might be critical and described in depth. Elsewhere the client may be happy to give the developer a free hand to select the best or most efficient solution.

The one essential is that, whatever is being specified, it is specified clearly and unambiguously so that there can be no confusion surrounding the resulting contract.

4.3.2 The contract

One of the most important documents to emerge from a requirements specification is the contract. This is an unambiguous statement of what is to be delivered. In addition to the price of the system, it will include milestones and deadlines which are to be met by the developer and penalty clauses through which the client will be reimbursed if they are missed. The contract will normally make provision for training of the client's staff by the developer and itemise the documentation to be delivered with the system. It will also state facilities which the client is required to make available to the developer so that integration, evaluation and training can be expedited. Service and maintenance agreements might also form part of the contract although it is becoming common for these to be handled under separate contracts these days.

4.4 Summary and assessment

At this stage you should be able to:

- appreciate the importance of the environment in which a system operates
- explain the need to support clients in identifying their needs
- outline the ideas of system investigation and modelling
- describe the contents of requirements and functional specifications
- relate the role of a requirements specification in a contract to supply

End of topic 4 test

Q1: A client commissioning a development is the best judge of -

a) Their business
b) How long the development should take
c) How much the development should cost
d) How to plan the development

Q2: Which of the following statements is true -

a) The client is always right

b) The client is always wrong
c) The client knows what they need
d) The client knows what they want

Q3: Systems analysis is all about -

a) Analysis
b) Modelling
c) Systems
d) Understanding

Q4: The key to a successful system investigation lies in identifying -

a) Boundaries
b) Communication flows
c) Management structures
d) Responsibilities

Q5: The environment of a system is the -

a) Atmosphere
b) Hardware
c) Software
d) Systems it interacts with

Q6: How many valid models of a system are there -

a) One
b) Two
c) Seven
d) Probably as many as there are people involved with it

Q7: Which of the following was NOT one of Licker's possible views of a system -

a) Appendage to the business
b) Data bank
c) Data processor
d) Decision support system

Q8: Requirements specifications SHOULD NOT cover -

a) Functionality
b) Implementation details
c) Time-scales
d) Training

Q9: Functional specifications include -

a) Design decisions
b) Development plans
c) Implementation details
d) Itemised functions

Q10: Contracts SHOULD NOT require the client to assist in -

a) Development
b) Evaluation
c) Integration
d) Training

4.5 Assigned task

Assigned task

1. **Submit Assignment 1** if you have not already done so.
2. Read ”The Case of the Killer Robot” Articles 2, 3 and 4 (Epstein 1997 or Taylor 2002) before embarking on Topic 5.
3. Each member of your tutorial group is to research a different topic from the list below. They all relate to ”The Case of the Killer Robot” and you should read the articles above first. If you are the first tutee on the group list then you are to research the first topic; if the second on the list then the second topic; and so on. You should prepare some preliminary notes on your assigned topic for your next tutorial where each topic will be discussed by the whole tutorial group under the guidance of your tutor. Following the tutorial you will be turning these notes into a 1000 word submission for **Assignment 2**. Producing Assignment 2 is one of the assigned tasks in Topic 6. It will be assessed and the mark will account for 33% of your final mark in the Praxis Unit.

Assigned Topics 10 - 18

- Structured Systems Analysis & Design Method (SSADM) *1st Tutee*
- Dynamic Systems Development Method (DSDM) *2nd Tutee*
- Waterfall Model of Software Development *3rd Tutee*
- Unified Process Model of Software Development *4th Tutee*
- Rapid Prototyping *5th Tutee*
- Extreme Programming (XP) *6th Tutee*
- Reusable Software *7th Tutee*
- Open Source *8th Tutee*
- PRINCE Project Management Method *9th Tutee*

4.6 References

Epstein, R.G., 1997, *The Case of the Killer Robot.* John Wiley & Son.

Licker, P.S., 1987, *Fundamentals of Systems Analysis*. Boyd & Fraser.

Spice Girls, The, 1996, *Wannabe*[sound recording]. Virgin Records.

Stair, R.M. & Reynolds, G.W., 2003, *Principles of Information Systems*, 6th edition. Thomson.

Taylor, N.K., 2002, *The Killer Robot* [online]. Heriot-Watt University (MACS), 16th December 2002 [cited 7th July 2003]. SHTML. Available from:

http://www.macs.hw.ac.uk/~nkt/praxis/epstein/index.sht.

Answers to questions and activities

4 Analysis and Specification

End of topic 4 test (page 4)

Q1: a) Their business

Q2: d) The client knows what they want

Q3: d) Understanding

Q4: a) Boundaries

Q5: d) Systems it interacts with

Q6: d) Probably as many as there are people involved with it

Q7: c) Data processor

Q8: b) Implementation details

Q9: d) Itemised functions

Q10: a) Development