

CHAPTER V. REQUIREMENTS ANALYSIS AS AN INVESTMENT

Requirements analysis is a complex process that requires the involvement of a large proportion of the staff of a repository, over a sustained period of months or even years, and makes rigorous demands for documentation. As such it represents a substantial investment for any institution. Management will, quite reasonably, ask: what kinds of benefits will be derived from making such a substantial commitment? is the process actually necessary? and, if so, can the repository afford to consider replacing its present information systems given the costs in staff effort of planning for their replacement?

The need for the process derives from the very difficulty of doing it right; the actual requirements of any cultural repository for collections management are diverse and the detail required to master it all is enormous. The complexity of the requirement makes it very unlikely that anyone or any group of people could simply "go shopping" for a system and select the appropriate one. In addition, few cultural repositories can engage in a major procurement in such an informal fashion. Most will be required by boards of directors and public authorities which fund them to engage in a competitive procurement which, if it awards the contract to someone other than the lowest bidder, will require documented evidence of requirements that must be met. Therefore, the question of whether to define functional requirements may be moot for most institutions seeking to acquire new automated information systems. But the question of how much effort to invest remains.

Although it is often lost in the everyday demand for services, adding knowledge to the cultural store is the most important function of the cultural repository. Whether by acquiring representative or puzzling objects, describing them and conserving them for future analysis, conducting or making possible research and interpretation, or disseminating information through publication, exhibits and lectures, the cultural repository adds value to the information it holds. As most older cultural repositories can testify however, the earnest and concerted efforts of catalogers and curators over decades does not cumulate if it is trapped in a variety of different information systems with few operable links between them, as is often the case. Here a record book, there a card file, and elsewhere correspondence

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and an occasional article, all containing information about the holdings but none accessible to future researchers. An automated system which is no better conceived than each of the manual systems previously adopted by an institution will cost more, but suffer the same fate, as its precursors. Systematic and rigorous design of the information systems can prevent the abandonment of important finding tools with the retirement of curators or systems of classification.

Investment in the analysis of functional requirements is of permanent value. Data requirements rarely change as long as an organization is in the same business, so they, and the previously recorded data, will be transferable to future systems. Functional requirements which are stated to exclude technical consideration, such as "how" one achieves a specific end, have a considerable life. While the methods of implementing them, and the technical requirements of those methods, will change over time, the requirements themselves reflect actual business needs which are in turn fairly consistent.

Finally, systems analysis provides a baseline description of the present system, and the next system becomes the present system, so that the effort invested in an analysis of procedures and information flows of a future system will also be of direct benefit whenever the system is replaced. Test datasets, constructed to evaluate a system, also serve as the baseline for monitoring the system over its upgrades and enhancements, and will serve to test the next system for accuracy. Documentation of the steps in executing procedures not only helps to clarify expected behaviors (usually resulting in simplifying them) but also serves as documentation for management of its policies and methods.

There are a variety of techniques for developing documentation of requirements (and management should realize that all these long-term benefits depend upon the thorough documentation of the process of deriving requirements and of the requirements ultimately identified). Two such approaches will be discussed briefly here, that could be characterized as the "bottom-up" and "top-down" analysis. The methods are not mutually exclusive, indeed both usually appear together, but emphasis is placed on one or the other in most analysis processes.

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Bottom-up analysis proceeds from a definition of the information being collected by the repository. A survey identifies all the information sources presently used in the repository: all the files, the indexes, the guides and the organizational and classification schemes. For every finding system, all the data elements on the forms that comprise a record are documented. All the processes that create and use the information are defined. All the reports created from the information are identified and the data elements on this reports is defined. The result is a systems analysis of the information flow within an organization and the data being maintained by that organization. Data elements not used by any process, or used in a different form than they are recorded, are examined for possible elimination.¹⁴

Bottom-up systems analysis has the disadvantage of documenting the present system rather than future needs and of describing how the system appears to work at the day-to-day working level rather than how it serves management. The alternative, top-down analysis can have the disadvantage of not following existing practices closely enough and creating unnecessary transition problems as a consequence. But if it is done correctly, with frequent breaks for critique by staff involved in the daily work, top-down analysis can have great benefits both in rationalizing the system and making the information managed of direct importance to the goals and objectives of the organization.

Top-down analysis is conducted through a series of group processes in which the major purposes and functions of an organization are iteratively "decomposed" into their operative parts until (at least logically) the smallest activity, such as making a single observation or measurement and recording it in the system, is related to the largest purpose it serves. Exhibit 3 illustrates a portion of such a top-down decomposition text when it is completed, but the most important aspect of top-down analysis is the process, so the products should not simply be adopted or adapted from others.¹⁵

¹⁴ Lenore Sarasan has written a very useful guide to do it yourself, bottom up, systems analysis for museums which will meet the needs of most cultural repositories if rigorously carried out and intelligently interpreted, see, Sarasan, Lenore, "A system for Analysing Museum Documentation", in Light, Roberts & Stewart eds., Museum Documentation Systems: Developments & Applications, London, Butterworths, 1986

¹⁵ The best manual I know of is: Fong, Elizabeth N. et al., Guide on Logical Database Design, NBS Special Publication 500-122, Gaithersburg, MD, National Bureau of Standards, 1985

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The process of developing top-down requirements forces senior management to articulate goals and objectives and to understand the most mundane aspects of day-to-day collections management and processing, while bringing the staff face to face with the purposes which management has in recording information about the collections. This mutual awareness serves a training purpose the importance of which for successful implementation of a new information system cannot be overestimated. Failure to understand why certain information is needed is a serious problem faced in implementing any new system, and, since the use of the information depends on its quality, timeliness and consistency, it can prevent even the best designed system from working satisfactorily.

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Exhibit 3

DECOMPOSITION - AN ILLUSTRATION:

GOAL:

I. IMPROVE REFERENCE SERVICES

OBJECTIVES:

IA. GIVE USERS READY ACCESS

IB. PRODUCE THEMATIC REFERENCE GUIDE

IC. PUBLISH GUIDE TO HOLDINGS

REQUIREMENTS:

IA1. System should provide online access by Topic, Date, Form of Material, Creator & Geographical Terms & by Boolean combination of these to the file level

SPECIFICATIONS:

- 1A1a. Indexes support broader and narrower term x-reference
- 1b. User browses indexes in window
- 1c. Boolean search provided as command or as template, user selected
- 1d. Topical terms drawn from natural language of title field & abstract
- 1e. Hierarchical inheritance of terms group/collection & series to file