

INTRODUCTION TO STRUCTURED SYSTEMS ANALYSIS AND DESIGN

A methodology is a set of documented practices and procedures that defines the development life cycle, and specifies how systems are to be developed.

Organisations fall between rigidly formal methodology and those with no methodology at all.

The Structured methodology has been developed to complement the conventional approach to systems analysis and design, and provide a comprehensive set of standards:

- Standard Procedures
- Standard Tools and Techniques
- Standard Products and Documentation

Why is it needed? Today systems are huge and therefore it is difficult if not impossible to write a single specification for the whole system. Structured analysis methods allows the system to be broken down into smaller 'mini-systems'.

The motivation of this development has been the inherent weaknesses in the conventional approach:

- difficulty of communication
- minimal user involvement
- large conceptual leap from analysis to design
- inconsistency of approach leading to low productivity and duplication of effort
- difficulty in maintaining the system
- difficulty in planning, estimating and monitoring project development and performance

The objectives of any methodology should be:

To establish style and procedure -
the way a system is developed from new, or the way an existing system is enhanced or amended.

To establish a consistency of approach -
a list of activities needed;
An order for the activities required.

To establish management control -
produce and provide milestones and checkpoints for the development.

To encourage quality of the product -
Ensure that the right product is built to the right specification.

Principles of Structured Methodology

The principles on which the methodology has been constructed are:

- projects should be broken down into defined stages, with each stage further decomposed into defined tasks
- every task should produce precise working documentation
- tools and techniques should be provided to facilitate the execution of these tasks
- it should be DATA DRIVEN and not process driven. The data in a system does not significantly change; only the way it is handled changes over a period of time.
- logical design should be carried out before physical design and should be hardware/software independent
- the development of a project should be iterative
- estimation of performance should be carried out before the physical design is committed to implementation
- users should be involved throughout all the stages of analysis and design.

The Structured Methodology

Analysis and design are separate activities. Analysis defines what has to be done, whereas design defines how it will be done.

The structured methodology outlined here is divided into six stages:

Stages 1 - 3 are concerned with Analysis

Stages 4 - 6 are concerned with Design

The six stages of analysis and design are:

- | | |
|---------|---|
| Stage 1 | Fact-finding and Analysis of current system |
| Stage 2 | Derive logical system description |
| Stage 3 | Prepare logical description of new system |
| Stage 4 | Examine options in physical implementation |
| Stage 5 | Select option |
| Stage 6 | Prepare the Structured Specification |

Each stage is broken down into steps/tasks with one or more products or working documents. Project team members know what has to be produced, when it has to be produced and the format in which it has to be produced. Filed under standard filing references, these products form the Project Files and, ultimately, the system specification.

Several of the working documents are pictorial, using simple, easily understood conventions. Supported by narrative and tabular information, they provide an acceptable communication medium with the user, form the basis for discussion and early error correction, and provide 'milestones' or check points for project management and control.

Perhaps at this point it would be as well to consider what the structured methodology will or will not do.

It provides:

- the building blocks for systems analysis and design; ie stages, steps, tasks and their related end-products
- interfaces between these steps and other development tasks
- techniques and tools to carry out the tasks
- standard documentation
- review points for quality assurance; ie end-products, quality criteria, checklists, etc

What it does not do:

- project estimating and control. It is a considerable aid but if you do not control the project it will not be controlled
- the actual systems analysis and design. The analyst still needs the expertise to use the techniques and tools.
- it is not a solution to development problems. It is a method and a series of tools and techniques designed to increase productivity and provide more cost-effective systems which satisfy the users' requirements.

The stages or steps which result from the structured methodology and provide the 'road map' for analysis and design is known as the Project Life Cycle or the System Life Cycle. There are two views of this life cycle, one as seen from management and the other from the viewpoint of the Analyst. In general the life cycle can be considered as follows:

- Initial strategy
- Feasibility study
- Requirements analysis
- Systems analysis
- Specification
- Design
- Development
- Testing
- Implementation
- Maintenance
- Review

This life cycle is an iterative process and is usually shown as a continuous circle of events.

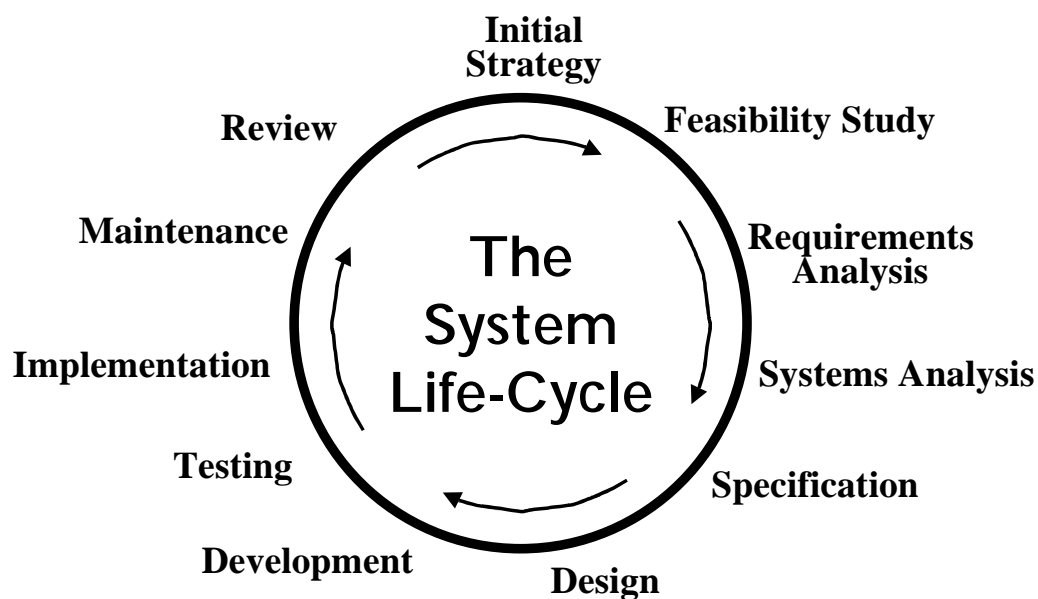


Figure 1

The Six Stages of Analysis and Design

STAGE	ACTIVITY	INPUTS	OUTPUTS	DOCUMENTATION
1	Fact Finding & analysis of current system.	Terms of Reference Interview, Historical records, etc.	Current Physical System description	DFD's, Mini-Specs, DD, Interview Notes.
2	Derive Logical System Description	Current Physical System Description User Comments	Current Logical system description	DFD's, Entity Model, TNF, DD
3	Prepare logical description of new system	Current logical system description User Requirements	New logical system description	Entity Model, Process File Structure Chart, DAD, DD
4	Examine Options in physical implementation	New logical system description User comments Hardware & software options	Cost & Benefit Analysis	CBA Report, Hardware options, Software estimates
5	Select Option	Cost & Benefit Analysis User Preference	Select an option	Option selection signed off.
6	Prepare Structured Specification	Selected option New logical system description	Structured Specification Budgets, schedules etc.	Structured Spec, Project Plan, PERT, Gantt and BAR charts etc.