

INS 301

Course Outline

1. Introduction -----Lecture 1
2. Feasibility Analysis and the System Proposal / Object Oriented Analysis ----- Lectures 2 & 3
3. Systems Analysis/Requirements Discovery -----Lecture 3 Cont...
4. Systems Development Life Cycle (SDLC) methodologies ----- Lecture 4

Lecture 1**Introduction**

In today's world, **Information systems** are critical to the success of organizations regardless of the industry to which such organizations belong. Many organizations therefore invest in Information systems in automating their business processes because of the diverse benefits that are derivable from their deployment and use. Investment in Information systems can be regarded a waste/failure if such information systems do not aid the organization in achieving its set objectives/goals.

Function of Information Systems: Information systems (IS) help organizations capture and manage data to produce useful information that supports an organization and its employees, customers, suppliers and business partners

For Information Systems to help organizations achieve set goals/objectives, they must have been developed with such goals in mind.

The development of Information Systems involves the employment of one of several standard methodologies and more importantly, development **tools** which are used at different stages of the system development process. These tools generally ensure amongst others efficiency, accuracy, speed, effective documentation and flexibility in the development process.

Before we proceed, it is important that we go through some basic definitions.

Information System (IS)

This is an arrangement of ;

- People
- Data
- Processes, and
- Information technology

that interact to collect, process, store, and provide as output the information needed to support an organization.

Information Technology (IT)

This is a contemporary term that describes the combination of;

- Computer technology (hardware and software) with
- Telecommunications technology (data, image and voice networks).

Types of Information Systems

On a general basis, types of information Systems can be identified in terms of their specific areas of application and/or function. Some types Information System include:

- Transaction Processing System (TPS)
- Decision Support System (DSS)
- Management Information Systems (MIS)
- Expert Systems (ES)
- Executive Support System (ESS)
- Office Automation System (OAS)

System Stakeholders

By System stakeholders we mean any category of persons who has anything to do with the system or any interests in the Information system. Stakeholders for Information systems can be broadly classified into five groups:

- System Owners
- System Users
- System Designers
- System Builders
- System Analysts

Perspective/View of Stakeholders

Each of the above stakeholders has a different perspective (view/impression) of the Information System.

This is explained below.

System Owners

- There can be more than one system owner depending on the size of the Information System (Not organization). System owners usually come from the ranks of management.
- For *Medium or large information systems*, system owners may be the middle or executive managers.

For *Small information systems*, system owners may be middle managers or supervisors.

Facts about system owners

System owners tend to be interested in the bottom line. That is:

- ✓ how much will the system cost?
- ✓ how much value will the system return to the business and/or shareholders

System Users

- ❖ System users are mostly concerned with the **Business requirements** in terms of **functionality** of the system. They are unlike system owners less concerned about the costs and value added to the business.

Facts about system users

System users tend to be interested in the following:

- ✓ The functionality provided by the system in terms of assisting in performing a given task
- ✓ Ease of learning how to use the system

Classes of System Users

There are many classes of system users but they can be broadly categorized into *Internal & External* users. Each class should be directly involved in any information systems project that affects them. Classes of system users are:

- **Internal System users**
 - Clerical and System users
 - Technical and professional staff
 - Supervisors, middle managers, and executive managers
- **External System Users**
 - Customers
 - Suppliers
 - Partners
 - Employees

System Designers

- ❖ System designers are technology specialists for information systems. System designers are interested in the design of systems based on information technology.

Facts about system designers

System designers focus more on:

- ✓ Technical specialties
- ✓ System designs based on Information technology choices

System Builders

- ❖ System builders are technology specialists whose role is to construct the information system based on the specifications of the system designer.

Facts about system builders

- ✓ Construct information systems based on specifications of the system designer
- ✓ In a small company or small information systems, system designers and system builders are often the same people.
- ✓ In large organization and perhaps large systems, they (system designers & system builders) are often separate jobs.

System Analysts

- ❖ A System Analysts is a specialist who studies the problems and needs of an organization to determine how people, data, processes and information technology can best accomplish improvements for the business/organization.

While other stakeholders may have very different perspectives of the information system, the System analyst bridges whatever gap that exists amongst the other stakeholders.

Facts about System Analysts

- ✓ Systems Analysts understand both business and computing
- ✓ Systems analysts initiate change in the organization
- ✓ The systems analysts is basically a *problem solver*
- ✓ System analysts study business problems and opportunities and the transform business and information requirements into specifications for information systems that will be implemented by various technical specialists.

A Simple System Development Process

Definition

System development process is a set of

- activities,
- methods,
- best practices,
- deliverables, and
- automated tools

that stakeholders use to develop and maintain information systems and software.

Facts about System Development Process

- ✓ There is no one single standard set of processes that every organization conforms to.
- ✓ **Every organization follows what it considers a standard set of processes** based on its unique information systems project at hand and/or the company's policy.
- ✓ While these processes may vary from one organization to the other, a set of general problem solving principles is usually followed by all.

General problem solving principles [i.e., as regards System development process]

- Identify the problem
- Analyze and understand the problem
- Identify solution requirements and expectations
- Identify alternative solutions and choose the best course of action
- Design the chosen solution
- Implement the chosen solution
- Evaluate the results (If the problem is not solved, return to step 1 or 2 as appropriate.)

The above 7 steps can be simplified into the following 4 steps shown in the table below

Simplified system development process	General problem solving steps
System Initiation	1. Identify the problem (Also plan for the solution)
System Analysis	2. Analyze and understand the problem 3. Identify solution requirements & expectations
System Design	4. Identify alternative solutions and chose the best course of action 5. Design the chosen solution
System Implementation	6. Implement the chosen solution 7. Evaluate the results (repeat steps 1 to 2 if problems is not solved until it is ok)

System Development Process

Where do system development projects come from?

Who initiates the system development process?

- System Owners
- System users

What motivates System users and System owners to initiate Information Systems projects?

- Problems /Challenges
- Business Opportunities
- Directives (e.g from Government, regulatory agency or an entity's management)

Some of the problems/challenges that induce the initiation of Information Systems are listed below using the acronym PIECES

P = Performance (the need to correct or improve performance)

I = Information (the need to correct or improve information & data)

E = Economics (the need to correct or improve economics, control costs, or increase profits)

C = Control (the need to correct or improve control or security)

E = Efficiency (the need to correct or improve efficiency of people & processes)

S = Services (the need to correct or improve service to customers, suppliers, partners, employees etc)

Some common terminologies used in Information Systems project development.

Scope Definition

This involves

- Establishing if the problem worth looking at
- Establishing the size and boundaries of the project
- Establishing the project vision
- Establishing any constraints or limitations

Problem Statement

This involves

- statement and categorization of problems, opportunities, and directives
- stating the constraints and an initial vision to the solution

Note: The goal here is not to solve the problems, opportunities, and directives but only to catalog and categorize them.

Scope creep

This involves

- a situation where the requirements and expectations of a project increase, often without regard to the impact on budget and schedule.
- The entire project literally exceeds the original scope boundaries

Statement of work

This is a statement in documentary format that

- States the contract with management and the user community to develop and/or enhance an information system
- Defines vision, scope, constraints, high-level user requirements, schedule, and budget

Problem Analysis

Problem analysis involves the following

- Studies the existing system and analyzes the findings to provide the project team with a more thorough understanding of the problems that triggered the project.
- Enables the systems analyst to uncover new problems previously unknown even to system owners
- Enables the Systems Analyst to determine emphatically whether or not the BENEFIT derivable from solving the problems exceed the COST of building the system.
(This is often referred to in business terms as Cost – Benefit Analysis.)

It is important to note that there will always be an existing system (Not an Information System) regardless of whether it currently uses information technology.

Prerequisite for Problem Analysis

- Scope
- Problem statement

Requirements Analysis

This involves determining

- What capabilities should the new system provide for its users
- What data must be captured and stored
- What performance level is expected
- What the system **MUST** do and **HOW** it should do those things

One way the Systems Analysis achieves this is to simply approach the users and ask them what they desire from the new system (and carefully avoiding discussing technology issues or technical implementation)

Note: This is perhaps the most important phase of System Development. Errors, inaccuracy and omissions in requirements analysis result in user dissatisfaction with the final system and costly modifications.

Lecture 2**Feasibility Analysis and the System Proposal / Object Oriented Analysis****Objectives of this topic:**

- ✚ Identify feasibility checkpoints in the system's life cycle.
- ✚ Identify alternative system solutions.
- ✚ Define and describe six types of feasibility and their respective criteria.
- ✚ Perform various cost – benefit analyses using time-adjusted costs and benefits.
- ✚ Write suitable system proposal reports for different audiences
- ✚ Plan for a formal presentation to system owners and users.

*Quick Definitions:***Feasibility**

- ❖ Feasibility is the measure of how beneficial or practical an information system will be to an organization

Feasibility Analysis

- ❖ This is the process by which feasibility is measured

Perspectives (Views) of feasibility

As stated above, and as depicted by the diagram below, feasibility can be viewed mainly from the following perspectives (also referred to as tests of feasibility).

- Operational feasibility
- Technical feasibility
- Economic feasibility
- Schedule feasibility
- Legal feasibility
- Cultural / Political feasibility

Operational feasibility

- how well does the proposed system satisfy the system requirements stated?
- Is the measure of how well the proposed system solves the problems and
- How well does the system takes advantage of the opportunities identified during the *scope definition and problem analysis phases*

Technical feasibility

- Is the proposed technology or solution practical?
- Do we currently possess the necessary technology?
- Do we possess the necessary technical expertise?

Economic feasibility

- This determines whether the possible benefits of solving the problem (i.e., developing the system) are worthwhile.
- Essentially, economic feasibility is achieved by a cost-benefit analysis (i.e., juxtaposing the costs and benefits of the project and deciding based on facts presented.

Schedule feasibility

- Determining whether deadlines are desirable or mandatory

Legal feasibility

- Copyright issues
- Non disclosure agreements of source codes with contract staff e.g., programmers

Cultural / Political feasibility

- What are the Human-Computer-Interaction issues arising from the culture of the target audience of the proposed system?
- It deals with how the end users feel about the system?



Diagram : Feasibility Analysis

Feasibility checkpoints

A feasibility checkpoint is a point in the systems development life cycle at which management should

- Conduct a feasibility reassessment
- Conduct a management review

Facts about the Feasibility checkpoints

- ✓ The feasibility reassessment and management review should be conducted before moving on to the next phase of the development process
- ✓ A project may be canceled or revised at any checkpoint, regardless of whatever resources have been committed/spent in the project

Lecture 3**System Proposal**

This involves making recommendations to management in the form of a **formal** written report and/or oral presentation.

Facts about the System Proposal

- ✓ It is a deliverable of the **feasibility analysis**.
- ✓ It presents the technical *Knowledge, Process and Communication*
- ✓ It essentially involves *recommending* a solution
- ✓ It usually entails writing a formal business report/Oral presentation
- ✓ The report is written for system owners (i.e., they are to review the report and take decision(s) accordingly).

Written Report*Guidelines for determining the **length** of a written report*

- Reports to executive-level managers = one or two pages.
- Reports to middle-level managers = three to five pages
- Reports to supervisory-level managers = less than 10 pages
- Reports to clerk level personnel = less than 50 pages

Procedure for writing a report

- Paragraphs should convey a single idea
- Sentences should not be too complex.
- Write in the active voice
- Eliminate jargon, big words, and deadwood. For example, replace DBMS with Database Management System

Formal Presentation

This is a special meeting used to *sell new ideas* and *gain approval* for a new system

Points to note about formal presentations

- Successful presentations require **adequate preparation**
- Time allotted to presentations is usually brief
- Presentations offer immediate impact and feedback

Preparing for formal presentations

- Know your audience
- Avoid too much detail (as it might become boring)
- Use visual aids because of the usual limited time
- Each visual page should contain a single idea
- Practice the presentation in front of the most critical audience you can assemble

Conducting the Formal presentation

- Dress professionally
- Avoid using the word 'I'. Use the words 'We' or 'You' to connote ownership.
- Maintain eye contact
- Keep an air of confidence
- Be mindful of your own mannerisms

Time for Questions

A formal presentation will always include time for questions from the audience. This time allows you to:

- clarify some issues mentioned in the presentation and
- Allows the audience to interact with you(the presenter)

Lecture 3 (Continued...)**Systems Analysis/Requirements Discovery****Objectives of this topic:**

- ✚ Identify the fact-finding techniques for Requirements Discovery
- ✚ Determine when and how to use any of the fact finding techniques for requirements discovery during system development of a business Information system
- ✚ Explore the processes the Systems Analyst follows in working with System owners and users to produce a detailed understanding of the business requirements of an Information System.
- ✚ To correctly identify the Knowledge, Processes and Communication requirements for the users of a new system.

*Quick Definitions:***Requirements Discovery**

- ❖ This is the process and techniques used by systems analysts to identify or extract system problems and solution requirements from the user community of the information system.

System Requirement

- ❖ This is something that the IS must do or something the IS must have

Functional Requirement

- ❖ This is something the IS must do.

Non – functional Requirement

- ❖ This is a property or quality the system must have e.g., Security, ease of use, performance etc.

Fact Finding (Information gathering)

- ❖ This is the formal process of using research, meetings, interviews, questionnaires, sampling, and other techniques to collect information about system problems, requirements and preferences.

Requirement Definition Document

- ❖ This is the formal document that communicates the requirements of a proposed system to key stakeholders and serves as a contract for the systems project. It is also referred to as Requirements specification, Requirements statement and Functional specification

Consequences of failure to correctly identify system requirements

- The system may cost more than projected
- System may be delivered behind schedule
- System may fall short of users' expectation
- Increase cost of maintaining system if system eventually goes into use
- System may eventually not be reliable, and prone to errors
- Tarnished reputation of IT staff on the development team

Criteria for defining system requirements

- Consistency
- Complete
- Feasible
- Required
- Accurate
- Traceable
- Verifiable

Documenting & Analyzing Requirements

This involves the following:

- *Documenting the draft requirements* (Document initial requirements subject to refinement)
- *Analyzing the requirements* (A detailed analysis of requirements leading to refinements)
- *Formalizing requirements* (Communicating documented requirements to key stakeholders)

Requirements management

This involves managing the constantly changing requirements taking into consideration the feasibility of the system as new requirements emerge and/or existing requirements change. Requirements management essentially involves:

- Policies, procedures, and processes that govern how a change to a requirement is handled
- Specifies how a change request should be submitted
- Specifies how a change request is analyzed for impact to scope, schedule and cost
- Specifies how a change request is approved or rejected.
- How the change is implemented if approved.

Fact finding techniques

Some of the fact finding techniques used by the Systems Analyst include:

- Document Analysis (Sampling of existing documentation, forms and databases)
- Research and site visits
- Observation of the work environment
- Questionnaires
- Interviews
- Prototyping
- Joint requirement planning

Note : See Powerpoint slides for continuation of investigative techniques