Information Systems Analysis

Topic 1:
Introduction to Information Systems Analysis

Objectives

- Define and explain the term information system
- Identify types and examples of information systems
- Define and explain the abbreviation SDLC
- Discuss information systems analysis in the context of the SDLC
- Define and explain analysis and requirements capture
- Discuss the role of analysis and requirements capture in specific contexts
- Define the term methodology
- Determine the requirement for different methodologies
- Identify types and examples of information system analysis and design methodologies

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A Computer System

- A *computer system* can be described as a combination of hardware and software which people and organisations can use to undertake various processes and functions.

An Information System

- An *information system* can be described as a combination of software, hardware, data, business processes and functions which can be used to increase the efficiency and strategic, managerial and operational activities of an organisation, such as planning and decision-making.

- To enable the above activities, an organisation's information is gathered, processed, stored, used and distributed.

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Types of Information Systems -1

- Most organisations utilise a variety of information and usually have more than one information system

- Information can be used by:
  - senior management (strategic level information systems)
  - middle management (managerial level information systems)
  - operational staff (operational level information systems)
  - organisation-wide staff (knowledge level information systems)

- Information can be used for:
  - strategic planning
  - monitoring and controlling business activities
  - operational procedures

Types of Information Systems - 2

- The main types of information systems include:

  - Executive Support Systems/Executive Information Systems **(ESS/EIS)**

  - Decision Support Systems **(DSS)**

  - Management Information Systems **(MIS)**

  - Knowledge Management Systems **(KMS)**

  - Transaction Processing Systems **(TPS)**

  - Office Automation Systems **(OAS)**

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Executive Support Systems/Executive Information Systems

- These enable senior management to make strategic decisions.

- Internal and external information is gathered, analysed and summarised from the main functional areas of an organisation, such as manufacturing and sales.

- They allow an overview of the whole organisation.

- Examples include:
    - planning for new products/services
    - monitoring trends affecting products/services
    - monitoring competitor's performances

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Management Information Systems

- Internal sources of information taken from an organisation's transaction processing systems are summarised into management reports for middle management .

- Examples include:

    - market research

    - staff performance

    - budgeting

Decision Support Systems

- These enable management to make decisions when there is uncertainty about the potential outcomes of those decisions.

- Various tools and techniques are used to gather information, analyse the options and alternatives, simulate situations and predict outcomes

- Examples include:

  - deciding if the existing workforce will be able to keep up with production if sales of a product increase

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Knowledge Management Systems

- These enable employees to produce documents, graphics, etc, of knowledge and expertise which they can then distribute to colleagues and/or customers via emails, an intranet, the Internet.

- Examples and benefits include:
    - faster decision-making

    - customer care and support

    - employee training

    - faster information retrieval

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Transaction Processing Systems

- These enable routine transactions to be processed, such as updating records and generating reports

- Examples include:
  - stock control systems
  - payroll systems
  - billing systems
  - production systems
  - purchasing systems
  - sales and marketing systems

Office Automation Systems

- Facilitate the productivity of employees processing data and information.

- Examples include:
  - software systems such as Microsoft Office
  - software systems that enable teleworking
  - software systems that allow staff to work whilst travelling

Interconnection of an Organisation's Information Systems

- An organisation's information systems are interconnected, for example:

    - information taken from a Transaction Processing System can be used by another information system e.g. Management Information System

    - Management Information System uses information such as product sales data and then a report is generated that details how many sales of a product have been achieved in different regions.

SDLC

- SDLC refers to the *System Development Life Cycle*.

- The System Development Life Cycle is a method used for developing, implementing, maintaining and or replacing an information system.

- It consists of a series of steps undertaken during the analysis and design of an information system.

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The Steps of the SDLC

- *Planning* - identify, analyse and prioritise the needs of a new/upgraded information system

- *Analysis* - survey and structure the requirements of an information system

- *Design* - convert the recommended solution of the analysis into a new/upgraded information system

- *Implementation* - code, test, evaluate and install the new/upgraded information system

- *Maintenance* - upgrade and develop the information system

Information Systems Analysis in the Context of the SDLC

- The purpose of this step is to gather various information from an organisation, process it, summarise it, document it and produce a structured specification for a new/upgraded system.

- This involves using various tools of systems analysis, such as *data flow diagrams* to model the functional areas of an organisation.

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Analysis and Requirements Capture

- The purpose of *analysis and requirements capture* is to provide:

  - a description of all aspects of the current information system

  - a description of any problems that exist

  - a recommendation how to solve any problems and/or enhance or replace the current system

  - a detailed specification (solution) for a new/upgraded information system

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Undertaking Analysis

- The following questions should be asked when undertaking analysis of an information system:

  - What is being done?

  - How is it being done?

  - Who is doing it?

  - When is it being done?

  - Why is it being done?

  - Can it be improved and if so, how?

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Analysis and Requirements Specification - 1

- A detailed specification is necessary that details:
    - the *structure* of how the information system is organised
    - how it *functions* (e.g. data flow diagrams – Topic 2)
    - what *data* is input, processed and output
    - *user* requirements
    - *customer* requirements
    - *performance* requirements
    - *hardware* requirements

Analysis and Requirements Specification - 2

- A *software requirements specification (SRS)* is also provided, which includes details of the *functional requirements* of the system, such as the interactions between the users and the software and the *non-functional requirements*, e.g. the quality standards

- *verification* - ensuring that the information system is being developed correctly and that its design and implementation is following the recommended solution

- *validation* - ensuring that the correct information system is being developed and that it meets the user's needs as recommended

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Analysis and Requirements Capture in Specific Contexts

- Identifying the **stakeholders** (the organisation and its staff and customers)

- Using interviews, focus groups, observations, questionnaires to gather information from stakeholders

- Identifying the aims, functions and **constraints** (technical, operational, economic, legal and ethical) of the system

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Methodology

- A *methodology* refers to:
  - the **steps** that need to be followed when working on a task/project and in what **order** they should be taken (*procedures* to be followed)
  - **how** each should be undertaken (*tools* that can be used)

- In the context of analysis, it can refer to the steps taken when collecting information, analysing information and documenting the requirements.

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Different Methodologies

- There are several methodologies, which one used depends on:

    - the level of complexity of the existing/proposed information system

    - technical considerations

    - organisational considerations

    - user considerations

- However, a combination of methodologies can also be used

Types of Information System Analysis and Design Methodologies

- Hard Systems methodology - Structured Systems Analysis and Design Methodology (SSADM) (Topic 2)
- Soft Systems Methodology (Topic 3)
- Combined soft/hard methodology (Topic 4)
- Organisation-oriented methodology (Topic 6)
- People-oriented methodology (Topic 6)
- Process-oriented methodology (Topic 7)
- Object-oriented methodology (OOMs) (Topic 8)

Examples of Information System Analysis and Design Methodologies - 1

- *Hard Systems* – focuses on the technical requirements of a system
- *Soft Systems* – focuses on user requirements
- *Combined Soft/Hard Systems* – focuses on a combination of technical/user requirements
- *Organisation-oriented* – focuses on the aims and technical aspects of an organisation

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Examples of Information System Analysis and Design Methodologies - 2

- ***People-oriented*** – focuses on user requirements

- ***Process-oriented*** – focuses on processes and the relationships between them

- ***Object-oriented*** – focuses on the relationships between each aspect of the system

Choice of Methodology

- Each methodology aims to enable the following in a new/upgraded information system:

  - efficiency

  - functionality

  - accuracy

  - robustness

  - reliability

  - ease of use

  - extendibility

  - maintainability

Summary

This module covers:

- Methods to analyse the function and requirements of Information Systems
- Skills to compare systems analysis models
- Skills to examine systems analysis models in the wider context of the Internet and the social, economic and political climate of an organisation
- An overview of:
    - types of information systems
    - the systems development lifecycle
    - the purpose of the analysis and requirements capture of information systems
    - types of analysis and design methodologies

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Any Questions?