3.10 IT Systems in Organizations HL Study Guide

Objectives

1. Explain the challenges associated with IT project development
2. Explain the steps of the System Development Life Cycle (SDLC)
3. Explain the methods used to manage IT projects
4. Construct PERT and Gantt charts to model a project’s schedule
5. Distinguish between Waterfall and Agile methods
6. Discuss appropriate project management techniques and decisions

IT concepts to address in this topic

***Information systems, people and teams***

* The role and need for IT in organizations
* Organizational IT policies
* IT personnel and organizational structure: for example, information system (IS) managers, support staff, network manager, database administrator
* Development personnel: for example, manager, programmer, analyst, project manager

***The system development life cycle (SDLC)***

* Analysis of current situation
* Organizational requirements
* Methods of data collection: questionnaires, interviews, observation, literature searches
* Feasibility study
* Identification of possible IT solutions
* Requirements specification
* Justification of preferred IT solution
* Project plan (who, why, what, when and how part of the project)
* Project goals, scope and constraints, such as financial, time, technical, human-resource-related, risks, communication, procurement, quality
* Project initiation document
* Design considerations
* Inputs, data structure, processes, outputs, user interface
* Prototyping
* Development of the IT solution
* Initial testing, alpha testing
* Quality assurance and quality control
* Implementation
* Training and support of staff, documentation to support the new IT system
* Changeover methods: direct, phased and parallel running
* Beta testing
* Maintenance
* Phase out

***Project management issues***

* Need for project management
* Development methodologies: agile development and waterfall development
* Project management methodologies: for example, PRINCE2 (projects in controlled environments 2), SSADM (structured systems analysis and design method), PMBoK (project management body of knowledge), CMMI (capability maturity model integration)
* Iteration
* Time constraints, tasks, resources and milestones; Gantt and Pert charts
* Modelling systems: for example, entities, entity relationship diagrams (ERD), data flow diagrams
* Maintenance of legacy systems
* System support: for example, internal support, maintenance contract
* Incident management and escalation

**Review of stages**

The software development life cycle contains a large number of separate steps, which can be hard to remember. Some of these stages also have alternative names under different project management methodologies. An overview of the key stages is given below. As an ITGS student you need to be able to describe the components of each stage, explaining its role in the overall process. Where appropriate, you also need to be able to explain the different examples of each term and their advantages and disadvantages. For example, for user documentation you should be able to describe it as documentation designed to help the user understand the new system, give examples of user documentation such as user manuals, online tutorials, frequently asked questions lists, and explain the relative advantages and disadvantages of each of these methods.

Analysis Stage

* Project goals
* Scope
* Data collection
* Requirements specification
* Identification of solutions
* Business case
* Feasibility study
* Justification of solution
* SWOT
* Project plan
* Project management methodology
* Project schedule
* Project milestones

Design

* Inputs
* Outputs
* Data structures
* Processes
* System context diagram
* Data Flow Diagrams
* Entity Relationship Diagrams
* User interface design

Implementation Stage

* Development
* Alpha testing
* Prototyping
* Quality control
* Quality assurance
* User documentation
* Technical documentation

Testing stage

* Beta testing
* User acceptance testing
* Handover

Installation stage

* Installation
* Training
* Changeover

Maintenance Stage

* Maintenance
* Regression testing
* Support
* Incident tracking
* Phase out

**Key Language**

* acceptance testing - Testing performed by the client and users as part of the handover process.
* adaptive maintenance - Maintenance that changes software to make it work with a new software environment.
* agile development - Development method that focuses on creating small, working parts of a project at regular intervals.
* alpha testing - Initial testing of an IT system.
* analyst - In project development, person who documents the current system, finding its problems and areas for improvement
* attributes - Component of an Entity Relationship Diagram.
* beta tester - Person who attempts to find bugs in software before it is released to customers.
* beta testing - Testing of an IT system once all features have been added and only bugs need to be worked out.
* bug tracking system - Used to track and manage bugs in a piece of software.
* bugs - Errors in a computer program or system, hopefully found during testing.
* business case - Analysis of the benefits and problems of a proposed IT project.
* Capability Maturity Model Integration - Quality assurance method that describes an organization’s level of maturity.
* cardinality - Property of a relationship in an Entity Relationship Diagram.
* changeover - Moving from an old system to a new IT system.
* client - Person or organization who commissions an IT project.
* CMMI - Quality assurance method that describes an organization’s level of maturity.
* constraints Limitations within which an IT system must work.
* corrective maintenance - Maintenance that fixes bugs in software.
* CP - Longest (slowest) path through a project's development, as determined by using a PERT chart.
* Critical Path - Longest (slowest) path through a project's development, as determined by using a PERT chart.
* Custom / bespoke software - Software created specific for an individual or organization.
* data collection - Used to find information about an existing system during the development of a new system.
* Data Flow Diagram - Shows processes in a system and the flows of data between them.
* data structure - The way the data within an IT system is organized and related.
* database administrator - The person in an organization who is responsible for setting up, maintaining, and monitoring the organization’s database(s).
* delivery - Installing a new IT system at the client's premises.
* deployment Stage - in the SDLC where the system is deployed at the client's site.
* development manager - In project development, person who oversees programmers as they create the system specified in the design.
* DFD - Shows processes in a system and the flows of data between them.
* direct changeover - Immediate removal of an old system and complete replacement with a new IT system.
* emulator - A computer program which simulates another type of computer, so that it can run programs designed for it.
* end-user - Person who will use an IT project one it is finished.
* entities - Component of an Entity Relationship Diagram.
* entity relationship diagram - Shows the items of data stored in a system and the relationships between them.
* ERD - Shows the items of data stored in a system and the relationships between them.
* feasibility study - Examination of a proposed system to see if its creation is possible.
* Frequently Asked Questions - A list of common problems that users experience, and their answers.
* functional requirements - Specific features and functions that a proposed IT system must have.
* Gantt chart - Used to chart the stages of a planned IT project and the people responsible for each stage.
* handover - Point at which the developers of a system formally pass it to the client.
* IDE - Set of programs used by system developers to create IT systems.
* implementation - Stage in the SDLC where the system is created (programmed).
* incident escalation - Moving a problem with an IT project to a higher level if it cannot be solved.
* Incident management system - Used to keep track of problems and difficulties encountered in an IT system.
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* information system (IS) managers - Person responsible for all IT purchases, deployments, and systems within an organization.
* installation - Installing a new IT system at the client's premises.
* Integrated Development Environment - Set of programs used by system developers to create IT systems.
* internal support- Support for an IT system provided within an organization.
* legacy system - An old, out of date IT system which is still used because it is essential to an organization.
* load testing - Testing of an IT system with the amount of work it can be expected to process in real world conditions.
* maintenance - Alterations made to a system after it has been formally handed over.
* milestones - Key points during project development, such as the completion of a stage.
* network manager - The person responsible for the installation, configuration, and monitoring of an organization’s network.
* non-functional requirements - Conditions that a proposed IT system must meet, such as working on certain hardware or giving results within a certain time.
* off-the-shelf software - Software which is widely available and can be bought by anybody.
* online lessons - A form of training delivered online.
* organizational IT policies - Policies governing the appropriate use of IT, data integrity, security procedures, and other aspects of IT use with an organization.
* outputs - During analysis, a list of the results that a system must produce.
* parallel running - Running the old system and the new system side by side.
* perfective maintenance - Maintenance that changes software to incorporate new user requirements (or changed requirements).
* PERT chart - Charting system to show the inter-dependencies in projects.
* phase out - Gradually removing an old IT system from use.
* phased changeover - One part of an organization switches to a new IT system to test it, while others remain using the old system.
* PMBoK - Project Management Body of Knowledge. A project management methodology.
* preventative maintenance - Maintenance that changes software to avoid possible future problems.
* PRINCE2 - Projects IN Controlled Environments 2. A project management methodology.
* processes - During analysis, a list of the procedures a system must implement.
* procurement - The act of acquiring the necessary items (software, hardware, staff) to develop an IT system.
* programmer - A person who writes computer programs by following a design document.
* project goals - Clear statement of the intentions of a proposed IT project.
* project initiation document - Document used in PRINCE2 to describe the key features of an IT project.
* project management methodology - Systems and techniques designed to encourage successful projects and avoid project failure.
* project management software - Software to help plan, manage, and guide the process of IT project development.
* project manager - Person with overall responsibility for an IT project.
* project plan - Clear definition of the goals, scope, and schedule of a proposed IT project.
* prototype interface - Early version of a user interface to get feedback about its effectiveness.
* prototypes - An early version of a project, designed to get feedback from the client and users.
* quality assurance methods - In project development, used to ensure the whole development team are following standardized best practices.
* quality control processes - Processes to ensure code produced by programmers followed accepted best practices.
* regression testing - Testing to ensuring changes to an IT system did not break any previously working functionality.
* relationships - The links between separate items of data.
* requirements specification - Clear list of the functional and non-functional requirements for a proposed IT project.
* scope - Clear definition of the boundaries of an IT project.
* SDLC - The stages in the life time of an IT system, from its first proposal, through its design and creation, to its eventual phasing out.
* software testers - People who perform alpha, beta, and acceptance testing.
* source code- Instructions that make up the software, entered by the programmer using a programming language.
* SSADM - Structured Systems Analysis and Design Method. A project management methodology.
* support - Staff who help users with problems they encounter while using an IT system.
* support staff - Staff who train users and help them with problems as they occur
* SWOT - Analysis method sometimes used when creating a business case.
* system context diagram - High level DFD of a system.
* System development lifecycle - The stages in the life time of an IT system, from its first proposal, through its design and creation, to its eventual phasing out.
* technical documentation - Documentation intended for programmers and developers of an IT system.
* test - plan List of all tests and test data that should be tried with a system.
* training - Ensuring that users will be able to work with a new IT system.
* tutorial - A document which explains how to perform key tasks, step by step.
* user acceptance testing - Tests performed by a client before formally accepting an IT system from the developers.
* user acceptance testing - Testing performed by the client and users as part of the handover process.
* user documentation - Documentation intended for users of an IT system, helping them understand and use it.
* user interface - The part of a system that allows a user to interact with it.
* user manual- A document which explains to users how to use a computer system.
* virtual machine - A software implementation of a computer system, allowing one physical computer to run several "virtual computers", each with their own independent operating system and application software.
* waterfall development - Development method that focuses on completing each stage of the SDLC for the entire project before moving onto the next.